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V.17, Pt. I, Jan.-June

18805 A

JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL,

EDITED BY

THE SECRETARIES.

VOL. XVII.

PART I.—JANUARY TO JUNE, 1848.

"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of Asia will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted; and it will die away if they shall entirely cease."—SIR WM. JONES.

CALCUTTA :

PRINTED BY J. THOMAS, BAPTIST MISSION PRESS.

1848.

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Errata.

Page 80, line 30, for "stories" read "stones."

— 490, — 13, for "23 $\frac{1}{4}$ " read "2 $\frac{3}{4}$."

— 492, — 3, for सुकाम read मुकाम.

— — — for गुसरानां read गुसरावा.

— — — 17, for पेतुम read पेतुम्.

— 493, — 9, for जनो read जनैः.

— — — 13, for बद्धै read बद्धै.

— — — 14 for अद्भि read पद्भिः.

E R R A T A.

Page 80, in Col. J. W. OUSELEY's note, *for* "adhering to the stories,"
read "adhering to the stones."

JOURNAL
OF THE
ASIATIC SOCIETY.

JANUARY, 1848.

Memoir upon the Quantity of Iron necessary in a Tension Chain Bridge.—By Rev. J. H. PRATT.

. To demonstrate, that the QUANTITY OF IRON in a Suspension Bridge, necessary to enable each part to sustain the greatest tension to which it will be subjected when the road-way is loaded to the greatest extent, IS ALTOGETHER INDEPENDENT of the FORM of the bridge, HOWEVER COMPLICATED THAT FORM MAY BE, and depends solely upon the width of the bridge, the height of the piers above the road-way, the thickness of the first link in leaving each pier, and the angle that link makes with the horizon.

In the controversy recently mooted in India regarding the superiority or inferiority of Taper-Chains in the construction of Suspension Bridges, when compared with uniform or common-chains, the consideration of the Quantity of Metal employed is one of considerable practical importance. According to the remarkable property which we have above enunciated, and shall soon proceed to demonstrate, the Quantity of Iron actually necessary to resist the strains is IN THEORY the same for all forms and positions of chain and suspending rods. But this property points out to us, that in the ACTUAL CONSTRUCTION of Bridges the quantity of metal employed will be greater in proportion to the greater variety of strain. For there would always be a practical

difficulty in the way of making every portion of iron in a complicated structure *exactly proportional* to the tensions, and no portion must be *thinner*, otherwise the loaded bridge would be in danger of falling, and therefore the probabilities are that many parts would be *thicker* than absolutely necessary. And therefore, as we have said, the economy of iron will be practically greatest in bridges where the varieties of tension are least. This tells, then, in a practical point of view against the Taper-Chain system in the question Taper-chain *versus* Common-chain bridge.

We shall now proceed to the demonstration of the property enunciated, first, however, proving the following lemma which we shall find of use in the course of our investigation.

Suppose, in the first instance, that the bridge is as is represented in fig. 1. This is given as a simple case to which we shall refer subsequently as a standard. The road-way is supported by two rods AB , AB , proceeding from the piers, and attached to the road-way at B and B . The tensions of these rods will not only support the weight of the loaded road-way, but will produce a tension in the line BB , which must be provided for by inserting a rod of iron, BB , of a proper thickness, i. e. proportional to this horizontal tension, to prevent the suspending rods from *tearing* the road to pieces. The rods AB , AB must be held down by bolts, as shown in the diagram. Let C be the middle point between B and B : and Cb be drawn perpendicular to AB produced.

LEMMA.—*The quantity of iron in AB and BC necessary to resist the strains is equal to a bar of the thickness at A , and of the length Ab .*

Draw CD perpendicular to BC and meeting AB produced in D .

The tension of BA at B is balanced by two forces, (1) the tension of BC , and (2) the portion of the weight sustained, acting in BW .

The triangle BCD has its sides parallel to the directions of these forces, and these sides are therefore proportional in magnitude to the three forces,

$$\text{Hence, tension of } BC = \frac{BC}{BD} \times \text{tension of } BA$$

$$= \frac{Bb}{BC} \times \text{tension of } BA,$$

since the triangle BbC is similar to the triangle BCD .

But the transverse section of iron is to be proportional to the tension. Hence

$$\text{Section of } BC = \frac{Bh}{BC} \times \text{section of } BA.$$

$$\therefore \text{Quantity of iron in } BC = BC \times \text{section of } BC \\ = Bb \times \text{section of } BA.$$

Hence the quantity of iron in AB and BC together $= AB \times \text{section of } AB + Bb \times \text{section of } AB = Ab \times \text{section of } AB = \text{quantity in a bar of length } Ab, \text{ and thickness at } A.$ — Q. E. D.

We shall now proceed to give, first a Geometrical, and then an Analytical demonstration of the Fundamental Proposition which is the subject of this communication.

1. GEOMETRICAL DEMONSTRATION.

Let fig. 2 represent the bridge, the dark lines representing the iron work. The lower parts EB , BC of the rods in fig. 1 are removed, and replaced by EF , FC , and EG , GC , on both sides the bridge: the rod FC is necessary to counteract the horizontal strain of FE , and the rod GC is necessary to hold down EG , EG in position.

We have to show, that if these four new rods are proportional, in transverse section, to their strains, the quantity of iron in them is the same as in those which they replace, viz. in EB , BC .

Draw Ch perpendicular to EF produced, and Cg perpendicular to EG produced. Then, by the property already proved in case of fig. 1, the quantity of iron in EF and FC $=$ quantity in a length Eh of same section as EF , and the quantity of iron in EG and $\frac{1}{2} GC^*$ $=$ the quantity in a length Eg of the same section as EG . Now the tensions of EA , EF , and EG acting at E are in equilibrium. Draw the parallelogram JH . Hence the sides of the triangle BHE (as also of EJB), being parallel to the directions of these three forces, are proportional also to them in magnitude.

* The other half of GC 's substance belongs to the other half of the bridge.

Hence tension of $EF =$ tension of $EA \times \frac{EH}{EB}$

\therefore section of iron in $EF =$ section of $EA \times \frac{EH}{EB}$

Also tension of $EG =$ tension of $EA \times \frac{EJ}{EB}$

\therefore section of iron in $EG =$ section of $EA \times \frac{EJ}{EB}$

Hence the quantity of iron in $EF, FC, EG, GC =$ quantity in Eh and Eg

$$= Eh \times \text{section of } EF + Eg \times \text{section of } EG$$

$$\therefore \text{section of } EA \left\{ \frac{Eh \times EH + Eg \times EJ}{EB} \right.$$

But by a property, (which we shall prove below, and which we defer at present in order not to interrupt this demonstration)—

If EH, EJ represent the magnitudes and directions of two forces of which the magnitude and direction of the resultant is EB , and from any point C perpendiculars be drawn upon these three directions, (produced if necessary,) as Ch, Cg, Cb : then $EH \times Eh + EJ \times Eg = EB \times Eb$.

This being assumed the calculation above gives—

$$\begin{aligned} \text{Quantity of iron in } EF, FC, EG, GC &= Eb \times \text{section of } EB \\ &= \text{quantity of iron in } EB \text{ and } BC. \end{aligned} \quad \text{—Q. E. D.}$$

We shall now demonstrate the property we have just assumed.

The lines in (fig. 3) are the same as in (fig. 2), except that in addition Hk, Jj , are drawn at right angles to EC and meeting EB in k' and j' . Now the triangles EHk, ECh are similar.

$$\therefore EH : Ek :: EC : Eh$$

$$\therefore EH \times Eh = EC \times Ek.$$

So also from the similar triangles Ehk', EbC we have

$$Ek : Ek' :: Eb : EC.$$

$$\therefore EC \times Ek = Eb \times Ek'.$$

$$\text{Hence } EH \times Eh = Eb \times Ek'.$$

In precisely the same manner

$$EJ \times Eg = Eb \times Ej'.$$

Now in the triangles EHk', BJj' the angles are equal, and $EH =$

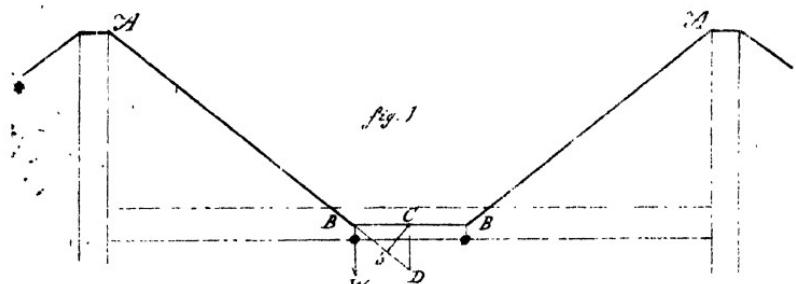


fig. 1

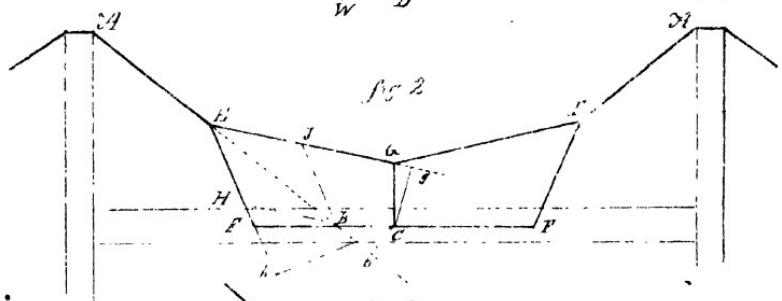


fig. 2

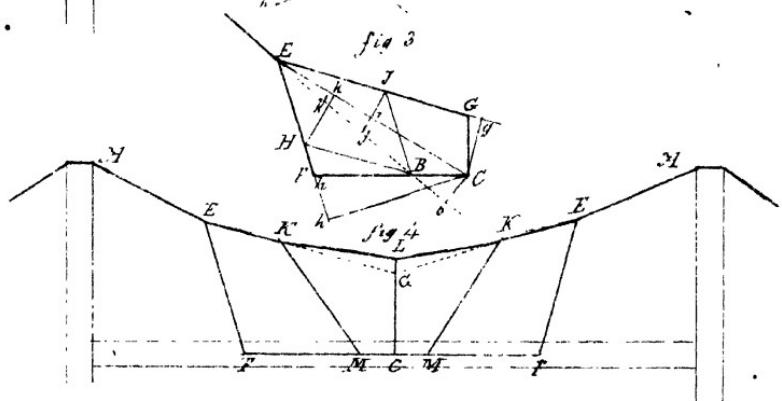


fig. 3

fig. 4

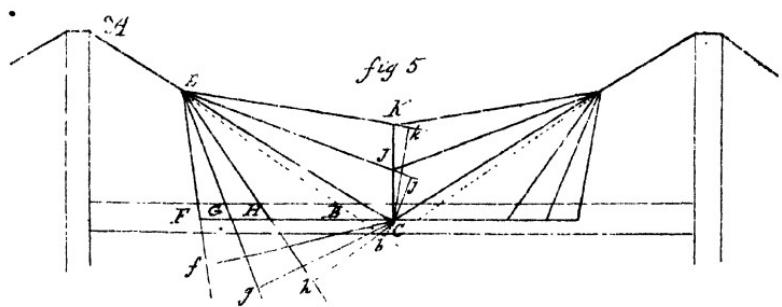


fig. 5

BJ : hence the triangles are equal, and $\therefore Ek' = Bj'$.

$$\therefore E_{k'} + E_{j'} = B_{j'} + E_{j'} = BE.$$

Hence, then, from the above

$$EH \times Eh + EJ \times Eg = EB \times Eb. \text{---Q. E. D.}$$

We have thus proved the Proposition, which we began by enunciating, in the case represented in fig. 2. But the same is true in any other case. For (see fig. 4.) we may suppose the rods KG , GC taken away, and others KM , MC , KL , LC put in their place, and the reasoning will be precisely the same, and the result the same, however many subdivisions be made. And therefore the property is universally true.

The above demonstration is GEOMETRICAL only; but by the help of analysis we may give the following proof which at once applies to every case which can occur.

2. ANALYTICAL DEMONSTRATION.

- Suppose EB , BC removed, and replaced by any number of rods EF , FC ; EG , GC ; EH , HC ; EJ , JC ; EK , KC , &c.

Let $\theta_1, \theta_2, \theta_3, \dots$ be the angles which EF, EG, EH make with AB .

Let S be the transverse section of iron in AB :

$S_1, S_2, S_3, \dots, \dots$ ditto.. in EF, EG, EH, \dots, \dots

$S_1/S_2/S_3$ ditto. EJ, EK, \dots

Then, by hypothesis, $S_1 S_2 S_3 \dots S'_1 S'_2 S'_3$, are proportional to the tensions of those rods.

Draw Cf , Cg , Ch , Cb , Cj , Ck , ... perpendicular to EF , EG , EH , EB , EJ , EK , ... Join EC . Let $EC = a$; and $BEC = d$.

Now because the tensions at E are in equilibrium :

$$\therefore S = S_1 \cos \theta_1 + S_2 \cos \theta_2 + \dots + S_1' \cos \theta_1' + S_2' \cos \theta_2' + \dots$$

Then multiplying the first of these by $a \cos d$ and the second by $a \sin d$ and subtracting.

$$\begin{aligned} S_1 \cdot a \cos d &= S_1 \cdot a \cos(\theta_1 + d) + S_2 \cdot a \cos(\theta_2 + d) + \dots \\ &+ S_1' \cdot a \cos(\theta_1' - d) + S_2' \cdot a \cos(\theta_2' - d) + \dots \\ \text{or } S \times Eb &= S_1 \times Ef + S_2 \times Eg + \dots + S_1' \times Ej + S_2' \times Ek + \dots \end{aligned}$$

* or quantity of iron in *EB, BC* = quantity in *EF, FC, EG, GC, &c.*—Q. E. D.

If any of these bars be similarly subdivided the same is true; and the most complicated system we chose may thus be devised; but the same result is true.

N. B. The effect of the *weight* of the rods themselves has been neglected in these calculations; because it is always so small a quantity compared with the tension. A bar of iron one-square inch section will support 9 tons without stretching: the *weight* of one foot of such a bar is only 3·31 lbs., which equals .00148 of a ton, or .00016 of 9 tons, a fraction so small that it may be omitted. But the Proposition is nevertheless rigidly true even when the weight of the rods is taken into account.

PART II.—*The most ancient Grammar of the Vedas, or the “Pratićākhyasūtren.”*

Translated from the German of Dr. Roth, by LUDWIG E. REES.

In the first treatise we spoke but in general terms of these writings. The following essay will dwell more particularly on them.

1. The Royal Library at Paris possesses (under No. 203 Devanāgari) a manuscript of the most extensive Pratićākhyā (on 236 pages, *Samvat 1751*) with the following words at the end of each *Paṭala*: iti-çri-pārshada-ryākhyāyām Ananda-pura vāstavya vajraṭa-putra Uvaṭa-kritau prati-çākhyā-bhāṣhye, &c. The same work is again found in a more ancient but more carelessly written copy in No. 28 of the East India House (204 pages ex codd. Colebr.) The sūtra text alone is again in No. 1355 (*Samvat 1781*, 24 double pages codd. Colebr.).

2. As to what regards the size, the Pratićākhyā of the very careless manuscript No. 598, East India House, is greatly inferior (83 double pages, likewise from Colebrooke's Library.) This bad copy however appears to have been written after a correct MS, and on that account restitution may be made in almost all cases. At the end of the fourth and fifth Adhyāya it is entitled: “ity ānanda-pura vāstavya Bhṛta vajrata-patra uvata-virachita-matrimodakākhye pratićākhyā bhāṣhye,” &c.

3. In the Bodleian Library at Oxford there are two manuscripts of a third work of this title. The first (17 double pages ex codd. Wilson) contains merely the text ; fol. 1—5 are wanting. The second (94 double pages, of which pages 1—22 are wanting ; also from Wilson's collection) gives both text and commentary, which last however does not appear to me to have been written by Uvāṭa. It bears the title : “iti-tri-bhāṣya-ratnē prātiçākhya-vivarane,” &c. Judging from this title it might be a compilation from three more ancient comments.*

Why the common title of these works can not be the original one, I have already mentioned above. But in the later Indian literature, it has been adopted, and in Madhusudana Sarasvati's *Prasthānabheda*, an Encyclopedia of Indian Literature, it is mentioned in the following manner : *tūtra sarvaveda-sādhāraṇī cikshā athaçikshā pravakshyāmity ādi panchakhandatnikā Pāṇinīna prakāçitā* ; *Prātiçākhā cha blinnar-úpā, prātiçākhya sāgnitā anyair eva munibhi : pradarçitā* (No. 2098, E. Ind. H. fol. 5, b). To this belongs Pāṇini's work, under the title of *cikshā*, which refers to the whole Veda. It has five divisions, each beginning with the words “*atha cikshām*,” &c. which divide it in çākhā, and bearing the name of *Prātiçākhya*, has been also treated on by other holy teacher. The author of the *Prasthānabheda* here considers the word çākhā to mean a division of the Veda. The book called *cikshā* in a more strict sense (grammatical doctrine) is said to point to all the writings of the Vedas. This little work, which consists of but sixty verses, and which is usually counted as one of the *Vedāngas*, certainly treats merely of the most general rules of the parts of Grammar, which are also spoken of in the *Prātiçākhyas*, and is without doubt, but a compilation from the latter and new composition. Colebrooke has marked this book as such in the manuscriptural notes of his copy.† Another book of the same

* I will mark these books according to the order in which I introduced them, as first, second and third *Prātiçākhya*, for shortness sake. In the first I can quote the paragraphs, as they are given in the MS. of the text in every single Paṭala, containing always from three to five verses, and also as they are marked in the commentaries. I quote the third also in the same manner. And since a revising subdivision is wanting in the second, we can consequently name only the principal sections, and we must add to this the number of pages in the MSS.

† No. 1378, E. I. H. if I do not mistake the number. Other MSS. of the *cikshā* may be found in the same place, Nos. 1981 and 1743.

title and contents, and at all event more valuable than the *Vedāṅga*, is called the *Māndukī-çikṣhī* (No. 680 E. Ind. H.) and contains 182 verses in sixteen divisions. But it is also of a later period.

The assertion of *Madhusūdana*, that the *Prātiçākhyas* explain merely single parts of the *Vedas*, is wrong, and the reason of this assertion may be a misunderstanding of the word çākhā, which in no way means merely a branch of the *Veda* writings, but also a branch of the *Vedaic* study, a school, and in this point of view is of the same meaning as *carana*. *Kṛityacintamani* in his commentary to *Gobhilāś Crautasutren* (MS. of the E. I. II. fol. 1) proves to us that the difference of the *Prātiçākhyas* has its foundation in the variety of schools, when, commencing with a *Sūtra*, he says, it was taken from the *Mādhyandina* çākhāya *pratiçākhyā*. The quotation is from the *second* of the above books, and we learn in this manner, what we could not exclusively have taken from the contents of the work. It is certainly in one instance expressly said (fol. 81, 6.), that the *Mādhyandinas* do not make use of certain letters, and in another passage (fol. 12. b.) the commentary remarks that that school had a certain term, which was indeed also that of the text. At this moment I can think of only one passage from *Sāyanas* commentary to the *Rigveda*, in which he quotes a *Prātiçākhyā* (No. 2133, E. I. II. fol. 21 a.) without any further reference. The quotation is from the *first* of the abovementioned *Prātiçākhyas*, as likewise the note in the commentary to *Pānini* I. 1, 9. The passages of the commentary to *Pān.* VIII. 3, 61, and VIII. 4, 67, speak in general terms of those books. One of my proofs of the antiquity and the original designation of these books is founded on the following passage of the *Nirukta* I. 17, para. sannikarsha : sabitā pada prakritini sarvācaranām pārshadāni. “The *Sanhitā* is the greatest contraction (of the words); pada (the single separated words) is the fundamental form of the *Sanhitā*; the (grammatical) books of instruction of the schools are also of this opinion.” It is remarkable that the first words of this passage “para; sannikarsha *sanhitā* also are found as *Sūtra* in *Pānini* I. 4, 109. They are however by no means of that description, that we have thence to conclude Panini’s dependence on *Jāska*, or *vice versā*, both might have used such a significant word on an object, so much discussed, from a more ancient source. What are now the pārshada and what the *carana*?

Durgá explains this passage perfectly satisfactorily : sarveshā caranānā sarva-cākhantarānā ity arthe :—Kim : párshadani svacarana parshady eva jaiopraticákha niyatam eva padâ—vagraha pragrihya krama sanhitâ svara lekshanam uchyate tânímâni parshadâni pâticákhyanity artha.— That carana can mean nothing else but school is clearly explained in Gágaldhara's commentary (MS. of the E. I. H. fol. 6. b.) to Mâlatimâdhava, p. I. 1, 2, of the Calcutta Edition ; “ carana guruva iti + carana-çabda : cākhâ vicshâdhyayana paraikata pannagana sangha vâci (tatra samûhe tegurava kriya kritvâ vedâdhyâpitra : + sagururja : kriyâ kritvâ vedam asmai pagachatita smriti : + gadva caranai : Kalâpâ dibhir gurava mahânta :) It is of exactly the same meaning in Pánini II. 4, 3, and VI. 3, 86,* and thence we see that before that grammarian, there were already many more schools in existence.

Párshada means, according to Durgá's explanation, a book of instruction treating on the grammatical rules, adopted as a guide by one or the other of these schools, and Prâtiçakhyâ must be considered as an adjective which marks the peculiar differences of the Parshada. From this alone we might conclude that our Prâtiçakhyas are nothing else but the Parshada of the cākhâ. Add to this that the quotation of Yâska, “ pada-prakriti : sahita” is really taken from Prâtiç. I. pat. 2. 1, and that also the remaining Prâtiçakyas contain that doctrine of the conneetion of the pada with the Sanhita. Prât. III. 1. f. 32. a. atha sahisâyâm ekaprânabhâve + yathâyuktad vidhi: Sâ traprapti + similarly Prât. II. 1. f. 16. b. 3. f. 25. b. Besides this the first Prâtiçakhyâ bears the title párshada, and is mentioned in the introduction as such : and lastly, Uvâta reñmarks in a commentary to the second Prâtiçakhyâ (fol. 41. b.) to a Sûtra, which treats of the sounds ri and lri, that the same are considered in other párshadas, as

* In the first passage (II. 4, 3,) it appears to me, that that the Sûtra was not correctly understood by the commentators, and after them by “ Böhlhlingk.” In my opinion anuvade means “ in the citation,” and the Sûtra means to say, that when the *quotation* of the opinion, &c. of two schools is given, both names are as Dvandva, and in the singular number. Considered in this point of view, Sûtra has a meaning, and one can explain the singular, while according to the commentators, one does not know why the plural is not as correct here as in the other case. I give here an example from Prâtiç III. fol. 46, a “ dvâv Uttamolloújasya repham. Both (visarga the antecedent of repha and kepha) become repha according to the opinion of the Uttama and Uttauja.” That Pan. I, 3, 49, in his commentary on the root *vad* with *ant*, has it in quite another sense, and adduces quite a similar example, can be no proof of the above.

svarabhakti, and on this he quotes a passage of the first Prātiçākhyā. In the third also they really bear this denomination (II. 9, &c.) And if we have assigned that denomination to two of these books by external evidence, the identity of the contents and of the posterior title will be of sufficient proof with regard to the third.

At last, what concerns the schools to which we have to assign these writings, the school of the Mādyandina, is pointed out for the second Prātiçākhyā, from which originated an edition of the Yajurvedā, as well as of the Vāg'asaneya Sanhita, and especially one of çatapatha Brāhmaṇa. At the conclusion of the book it is ascribed to Kātyāyana, with the words : "eva svarasarkārayo : Pratishshapayitā Bhagavān Kātyayana idā çāstrom āha."

Not merely the Sūtras of the Yajurvedā, and according to some, the Anukramani of Rik, are said to originate from this Kātyayana, but also especially the Vāgasaneyā Samhitā, which latter are particularly pointed out in the manuscripts (to B. No. 965, E. I. II.) that they are those of the Mādhyandina.

In the introduction by Uvata to Prātiç. II. fol. 41. b. as well as by Shadguruçishya in his Vedadipa, the introduction to the comment of the Anukramanī (after an Oxford MS. fol. 6. a.) the first Prātiçākhyā is ascribed to Caumaka, on whose shoulders many other books are thrown, for example the already mentioned Brihaddevatā, a book with the title of Rigvidhāna (about the application of the hymns of Rig to various purposes) which is yet extant ; a Pādavidhāna, the fourth book of Aitareya Aranyaka and several other writings on ceremonies. The abovementioned introduction of the first Prātiçākhyā originates without doubt from Uvata ; after Caumaka is pointed out as the originator of the Parshada, and the author has expressed his intention to explain the same ; he continues with the following verses, which I here write down, since their explanation may be doubtful : Champāyā nyavasatpūrva Vatsauā kulam : riddhiimat : Yasmin dviga-varagātā bhah-vricā pāragottamā Devamitra iti khyatas tasmingāto mahāmati sachaishtā pārshada-çreshtha : sutas tasya Māhatmana Nāmanā tu Vishnuputra sa kumāra iti çashyate teneja jog'itā vrittī, sakpshiptā pārshade spluṭa Parigṛihnantu viprendrā ; supasannā imā mama : agnānāl yad ayukta syāt tad rigū-kritya grilijata. In Campā there liyed a noble race of the Vatsas, from whom Devamitra descended, whose son Vishnuputra is

said to be a celebrated teacher, and author of the commentary to the Prātiçākhya before us. The writer of the introduction would have founded his comment on this commentary, but now he says as above,* that he began svaçaktyā with a commentary and moreover further on he claims the indulgence of the learned, which he would likely not have done this, had his work been nothing else than an extract (yakshiptā) from a more ancient book. One might therefore conclude that the author of this introduction was Vishnuputra, and that he spoke of himself in the third person, ya chaisha bis sphuṭa: sâkship might then be explained as meaning "condensed." But in this case the passage would contradict the abovementioned ends of Chapters, and the Pârshada çreshtha, were not in its proper place. I would consequently always prefer and accept the first explanation, that Uvâṭa hrud in the words "tene-yam, &c." underrated the extent and the value of his labour. In Uvâṭa's commentary we would thus have a work founded on the more ancient explanation of Vishnuputra. Though Uvâṭa himself is more ancient than Mahidhara, the commentator of the Vâgasaneyî (Colebr. Ess. I. p. 54, n.) and more ancient than Devarâga, the commentator of the Neighantuka he can yet not be very much earlier since he quotes Purânas in some passages.

As regards the Sûtras themselves, there appears to be no reason why we should not consider them the rules of a Veda school which took its name from Cauñaka, of the existence of which we have however no other evidence than the importance of the name in the later tradition of the learned treatment of the Veda, and perhaps also their presence in the compound of Câkala Cunaka (of the gana Kârtakaugapan) where it appears at the same time with the school of Câkalya. The first Prâtiçâkhya has repeatedly a particular regard to the doctrines of this latter, and it is imaginable that there was a nearer connection between the scholars of Cauñaka and Câkalya.

The third Prâtiçâkhya differs from the two previous ones in a most remarkable manner. Among the twenty names of grammarians with which he gives authority to his rules, there is not a single one which can be found in those two, or even in the Nirukta, while the three last mentioned books appear on the whole to have the

* In the proximity of the modern Compassur near Bhâgalpore (Burnouf Introduction, para. 149, n. Wilson, Varh. Pur. p. 445.)

same more ancient literature in view. There is yet another difference. The first Prātiçākhyā appears to relate throughout to the Sanhitā of the Rik in all his examples which he chooses, and sometimes even quotes its hymns after their authors, for example II. 7. Gotame chāminanta, with Gotama the last *a* in aminanta with an Anunāsika before the vowel *e*. (The quotation relates to Rik, I. h. 79. 2.) Though the second book does not mention any source for its quotations, yet I am lead to believe, that by far the greatest number originates from the Sanhitā of Rik, notwithstanding the circumstance that according to Indian tradition the zeal for the Vagasaneyā Sanhitā and the Catapatha Brāhmaṇa is only ascribed to the school of Mādyandina.

The Oxford Prātiçākhyā on the contrary, not only shows an immense difference in the choice of its quotations, but it also very frequently gives beginnings and names of sections, whose examples it quotes, among the latter, for example: grahaukhya yágyás certain Chapters of the Taittiriya Sanhitā bear these liturgic denominations. I have had no opportunity to investigate, whether these examples may be found in the respective parts of the above mentioned Sanhitā, the same denominations probably apply to the Vágasaneyi. But that the Taittiriya Sanhitā is rather the source of Prātiçākhyā, appears to me probable, from the naming of Taittiriyaka in some of his Sūtras, which treat of sound and pronunciation. (II. 11.) Notwithstanding this difference, there is of course very frequently an identity of examples, which can be very simply explained from the fact that both collections of Yajur have a great number of sections in common with the Riksanhitā. The author of the commentary to this book appears to be, as I have already mentioned, to be another than Uvaṭa. From the quotations at the end of book from Garuḍa Purāna, Devī Purāna, Brahma Purāna and Bavishya Purāna, we can guess of the time when he lived. The difference of these books then appears to arise by no means from the fact that they give a grammar, which in point of matter greatly differs one from another, and is based on different Vedaic books, but on the contrary their contents are essentially the same, if we do not speak of mere superficial differences, as in all the Veda writings it is the same style throughout found, their difference results only from the more or less exclusive use of the one or the other book in the choice of the document and from the manner of treatment, as of course in different schools it must be different.

I here note down a list of the grammarians to which the Prātiçākhyas refer. These names, as well as the whole Indian grammar, have also a historical meaning, for it appears that the dryness of the empirical analysis of language alone was powerful enough to overpower the imagination and to rescue the past from its all-consuming power. As there lies a treasure of historical and geographical knowledge in Pānini, we possess in the Prātiçākhyas the history of the Vedas study, and at the same time the history of one side of Indian development of mind which will always be again recognized as the centre of Indian life which runs through all centuries.

The first Prātiçākhyas contains the names of the following teachers :—

1. Cakalya ; his school Cākalas is also mentioned. According to Nir. VI. 28, the *pada pātha* originates from him, and *Durgā* (ad. 1. c.) calls him *pada kāra*. He is quoted by Pānini I. 1, 16; VI. I, 127; VIII. 3, 19, 4, 51, and in Aitareya Aranyaka III, 2, 6. Sayana to Rik. V. 4, 28, calls him *Maharshis*. Let us also further observe the passage of the Açvalāyana Sūtras, quoted in my first part. He is one of the speakers in the Vrihad Aranyaka to Vol. III. 9.

2. *Cakatayana*, likewise mentioned by Pānini III. 4, 111; VIII. 3, 18, 4, 50 ; compare the *Gana nadādis*. He is also mentioned in Nir. I. 3, 12, 13.

3. *Gārgya*. Pān. VII. 3, 99 ; VIII. 3, 20, 4, 67. (*Gana gargādis*) Açvalsū. grh III. 4. Nirukta 1, 3, 12; III. 13. Ar. IV. 6.

4. *Mandīkeya*, mentioned in Aitareya Arany III. 2, 6. Açv. gr. sū. III. 4.

5. *Panēlla*, *Bābhṛavya* Açv. gr. sū. III. 4.

6. *Vedamitra* (compare Wilson. Vish. Pur. p. 277.)

7. *Vyālli*, several times quoted in Hemachandra.

8. *Vaijaska*.

II. The second Prātiçākhyas mentions the following :—

1. *Aupacivi*.

2. *Cākalya*.

3. *Cakaṭayana*.

4. *Caunaka* (vide above.)

5. *Gārgya*.

6. *Gātukarnya*. This grammarian is mentioned in Aitar. Arany. V. 3, 3, together with Gālava and Agniveçyāyana, as an authority of the

rules which are to be observed during instructions in certain parts of the ceremonial Vrh. Arany. II. 6 ; VI. 6.

7. *Kācydpa* quoted by Pán. VIII. 4, 67.

8. *Kdnva.*

III. In the third Prátiçákhya we find the following names :—

1. *Agniveçya.* Pángâna tikakitávás and Garga. Vrh. Ar. II. 6.

2. *Agniveçyâjana.* Do. and Aitsr. Arany. V, 3, 3 (vide at II. 6.)

3. *Atreya.*

4. *Bhâradvâja* mentioned by Pan. VII. 2, 63. Vrh. Ar. II. 6.

IV. 6.

5. *Caitâyana.*

6. *Câñkhâdyana.* Gana garga.

7. *Gautama.* Vrh. Ar. II. 6. IV. 6. Açval. çrautasû. I. 3 ; II. 6; V. 6.

8. *Kândamâyana.*

9. *Kauhalîputra.*

10. *Kaindinya.*

11. *Mâdakjâ.*

12. *Paushkarasâli.* Pán. gana Taulvali and Jask.

13. *Pldkshi.*

14. *Pldkshâyana.*

15. *Sankritya* gana Garga Vrh. Ar. II. 6.

16. *Ukhyâ.*

17. *Vdmiki.*

18. *Vâtsapra.*

19. *Vitabhipdra.*

20. *Hdrita.**

It is superfluous to observe here that those of these names, to which there is no special reference, belong for the most part to the Vedaic literature, and if, in Indian history, every important epoch is characterized by a number of peculiar proper names, we may reckon those here mentioned as belonging to the more ancient epoch. By a reference

* To complete the whole we may here enumerate all the other grammarians or commentators mentioned in the Nirukta :—1. Aupamanyava ; 2. Audumbarayana ; 3. Agrâyana ; 4. Auruavabha ; 5. Carmaçirûs ; 6. Catabalâksha ; 7. Câkatâyana ; 8. Cakapûni ; 9. Gârgya ; 10. Gâlava ; 11. Kacchaka ; 12. Kautsa ; 13. Kraushtuki ; 14. Maudgalya ; 15. Sthaulashthîvi ; 16. Taitiki 17. Vârshyâyana.

of the appearance of a large number of those teachers in the Upaniṣads, Vrihad Aranyaka and Aitareya Aranyaka, there is no doubt that these books belong to a later period of literature.

The number of Grammarians, whose opinions are preserved to us in the Prātiçākhyā, already shows how far this art had spread, and Yáska (Nir. II. 2.) confirms this in a remarkable statement, according to which verbal roots are marked grammatically, in four different ways by the grammarians of four different countries. These four tribes are, besides the Prácyā and Udcya, also the Kamboga and Arya. Hence it is proved most irrefutably that the Kamboga were not only an originally Indian nation, but also a nation of Indian civilization, so that this civilization reached as far as the Hindu Kush at the time of Yáska. If we turn up the well known passage of Manu's laws (X. 43,) we will find that they were afterwards reckoned to be barbarians, because their manners became afterwards changed, and they were justly called Indians by the Greeks and Chinese. The same therefore happened to the Kombagas although in a less marked manner, which took place among the Zend-people and the *Indians at a more remote period.

In order to give a proof of the various grammatical matter which is treated in the Prātiçākhyas, I would have preferred the chapter concerning the accent for which we expect the most abounding and complete material here, as in the most ancient grammar which at the same time especially treats on Vedaic writings; the difficulty of printing it however, rendered more unbearable by being printed in Roman characters owing to the great number of accentuations, causes me to reserve this for a later and more circumstantial work. Instead of this we will speak of the doctrine of the Anusvāra, which contains also something peculiar to the Vedas, and also of the Pátha of the Veda.

ON THE ANUSVÁRA.

The most remarkable mode in the first and second Prātiçākhyā, in distinguishing the nasal sounds is that

1. All colored (rakta) or nasal sounds are called *Anundsika*, comprehending the last of the five *Vargas*, the *Yamas* and the *Anusvāras*.
2. Only the five nasals of *Varga* are called *Ndsikya*.
3. Those nasals which are not *Ndsikya* and not *Jama* are called *Anusvāra*.

• On the other hand in the first of these books any nasal element in general is again marked by the name of *Anusvára* (XIII. 1,) since it is said that according to the supposition of several grammarians the *Anusvára* was the source of the nasal sound, like the vowel a, i. e. a vowel element, that of the clear sound (áhur ghoshá ghoshavasánum akáram *eke* nusváram anunásikánám.)

A further difference however is found in the third Prátiçákhyá, where an *ánunásikya* is distinguished from *anusvára* and *násikya*. This *ánunásikya* is Bopp's primitive *Anusvára*. It will perhaps be well to adhere to this distinction, of which Pánini also is aware, although he does not always bear it in mind. As regards the pronunciation of the *ánunásikya*, the grammarians are, according to the account of the same book (I. 5,) of contrary opinions. *Caityáyana* insists that the *ánunásikya* is pronounced more emphatically (tivrataram) than the *anusvára* and the *uttama* (the nasals of the Varga.) Kauhalíputra considers all the nasals as equal, and Bháradvája declares the *ánunásikya* weaker than the *anusvára*. It is possible that this contradiction may have its foundation in the different usage of the word *Anusvára*.

The nose alone (Prát. II. 1, fol. 8. b.) is partly spoken of as the organ, with which the nasals are formed, and partly both mouth and nose (Prát. I. 13, 2; *rakta vacano mukhanásikábhjám*) or both organs are limited to the *anunásika* in a more strict sense (Prát. II. 1, f. 8, b.) and then the *anusvára* is said to be pronounced with the hanumúla (in the posterior part of the mouth.) These contradictions which are found in the same manner, with Pánini (comp. Böltlingk to I. 1, 8, 9,) originate from the circumstance, that the nasal was at one time considered as inherent to the vowel, and at another separated from it. Or how could, for example, Pánini consider the *anusvára* once as a vowel and then again say that it was pronounced merely with the nose, while he even points out to the nasal consonants of the Varga mouth and nose as organs, i. e. he considers them at the same time of a nasal and vowel kind. In the same manner the first Prátiçákhyá also speaks of the *anusvára* as being as well vowel as consonant. (I. 2).

As to what regards the usage of the real *Anusvára*, or according to the above distinction, of the *Anúnásikya*, as being in this respect a particular sound and no substitute, so far as in the place which it occupies every other nasal is impossible, the Prátiçákhyas teach the following :

1. THE REAL ANUNASIKYA.

Prat. I. 4, 6 : *n* at the termination of a word when following a long *a*, even when a vowel follows, is lost; *a*, in the *ānpaddā* : *pada-vrittayas*. We have as examples *agrán*, *gágrasánán*, *devahútamán*, *badbadhánán*, *Indra somán*, *trsháuán*, *nodeva deván*, *hanta deván* (for example *devahútama açván*).

Note.—Both the other Pratiçakhyas explain this case by a peculiar process; Prat. II. 3; fol. 38, 4; *ákáropadho jakáram*, i. e. the *n* terminating a word after a long *á* becomes before a vowel, a *y*, and according to an earlier *adhikára*, the *upadha* becomes nasal (likewise Prát. III. 1, 9). *Mahán* becomes *indras* consequently *maháyindras*; after the *Sútra-raja-vayo* : *padántayo* : *svaramadhye lopas* (4. fol. 56. b.) the *y* drops and it remains *mahá indrás*. After the same manner the omission of the Visarga is treated in the very same passage (4. fol. 44, b.) *kanthya-purvo yakáram ariphitas*, (namely, *visarg'aúiyas*) consequently *chitra: ádityánám*, *chitray ádityánám chitra ádityánám*. Pánini explains the latter change in the very same manner (VIII. 3, 17, 18, 19,) while he does not use it to explain the omission of the *n*; the difference here is certainly much greater. We have according to the opinion of the Indian Grammarians another example for the same occurrence in the word *pra-uga*. While the same is given in the Pratiçakhya I. 2, 1, without any further explanation in connexion with *puraetá*, *tita-unri* and *nama uktibhis*, as *vivritti* within the word; the second Pratiçakhya (4. f. 57, a.) has the *Sútra prayugam ití yakára lopas*. I doubt whether for this word, which in the Sanhitá itself is only twice met with (I. 7, 5, 6, and X. 11, 2, 3) we can give another derivation than that of the Pratiçakhya, which the later grammarians also adopt. The *y* appears like the *v*, to have been capable of such a softening (*laghuprayatnataras*, according to Cákatáyana, with Pán. VIII. 3, 18,) that nothing of it remained but the hiatus between the vowels, which it had separated (as in the *vikára* for *ai*, for instance *anvetavá u*). On that account we might regard the same on one side as a means for explaining a hiatus, on the other side however we might, (as the first Pratiçakhya) object to this substitution, and treat as hiatus (*pada-vrittayas*) the same Sandhi, which the second will explain by putting in a semi-vowel. It is however remarkable that the second and third Pratiçakhyas, as well as Pánini and the more ancient teachers quoted by

Him, instead of choosing the *v*, which offered itself so naturally for explaining the change of the visarga, preferred the more distant *y* for that purpose. From this we are led to conclude that *y*, even in the cases where it is entirely preserved, had yet a much softer sound than *v*, and thence appears much fitter than the former letter, also there to be inserted where the grammatical abstraction alone required a consonantical element which in pronunciation was indeed not at all expressed. For how much the nasal element lost its character as a consonant in the above ánpadá : padavrittayas, and went off in a vowel, we observe, not merely from the given denomination of the occurrence, but also from an application of the nasal sign derived from it which will be described afterwards, and which does not allow to consider it as anything belonging to a consonant.

(b.) In the *vivṛitty-abhiprāya-sandhayas pīvo annā rayivridhas*, dādhanvā yo, g'ug'urvā ya : svavā yáta dadvā vā.

N. B. Prát. II. 3, f. 37 b. has the same examples.

(c.) *Sparṣa-rephā-sandhayas*. The terminations *ūn* and *īn* change their *n* in rephā before hatam, jonau, vacobhlis, yán, yuvan, yūn, vanishishta (ut panír hatam úrmýá madantá. Rik I. 24, 5, 2,) and before vowels dasyúr ekas, nrír abhi.

N. B. Exceptions to (a.) are asmán upa (dhenur vág asmán upa sush-tutaitu) etávan, sphuráni, gachán (gachán iddadusho rátim) deván aját, hiranya chakráni (pacyá hiranya chakráni ayodashtrán,) máyáván, ghoshán (áyat te ghoshán uttará yugáni. III. 3, 4, 8,) tán açviná, avidván (avidván, ittháparo achetá :) payasván (payasván agna ágahi, I. 5, 4, 23) yagiyán putrán ádhehi ; patin uro (?) to c.

Prát. II. 3. f. 38. b. and 39. a. mentions besides an adhyáya beginning with açva, (of which book, I do not know) in which *ān* remains unchanged before a vowel, as exceptions also the following : lokán, mánushyán, amitrán before ut (lokán udag'ayat, amitrán, unnayámi, manushyán udagáyatám) and *ān* before ápnoti and iti (the latter in the Kramapátha, in which moreover this change cannot take place.)

Prát. III. 1, 9, names as exceptions raçmín (raçmín anu) çrapayán, yamán (suyamán útaye) patangán (patangán asanditas), samánán, archán (archán Indra grávánaś) yagiyán (yagiyán upasthe); lastly *ān* suffers no change before ud and atha (vidván atha.)

(d.) *Sparçoshma sandhayas.* Then, *n*, following a long vowel, is treated like the Visarga before the words charat (mahâç charati), chakre, chamasân, cha, cho, chit, charasi, chyotnas, chaturas, chikitván.

N. B. Prát. II. 1, 5, nakára : çakára chaparas. Exceptions : áyan, aírayan, ádhruvan, anadván, ghrníván (?) várúnán. According to Prát. I. the exceptions are : asmán (asmán cha tâç cha pra hi neshi. Rik II. 1. 16;) chamasân (yádá vyakhyaç chamasán chaturas. R. II. 22, 5, 4) paçûn cha sthátrin (?) cha I. 12, 8, 6.)

n is treated in the same way as Visarga in the combinations (dvaipada) tâste, sarvás tán, devás twa tâs trayasva, avadâs tvam.

(e.) *Sandhir vikrîntas*; in nrî : patibhyas nrî ; pranetram, nrî : pátram (I. 18, 1, 1.) svatavâ : páyus and nrî ; páhi çrinûdhî (giras).

N. B. To nrî : pati according to the observation of the commentator, is expressly added to çrinûdhî, because it is said in another place rakshá nrin pályasuratvam asmât. Prát. II. 3, fol. 28. a. only says nrin pakáre visarganiyam. Compare Pán. VIII. 3, 10. For svataván we give the example, bhuvas tasya svatavâ : payuragne. Compare Pán. ibid. II.

As an appendix the following is said : àdi-svaraç cottareshá pade pi, mâspacanyâ mâçchatve, mâçchatachcha. Examples : mâspachanya ukháyas (Rik I. 22, 6, 13.) ; mâçhatve vá priçane vá ; bradhna mâçchator Varunasya (VII. 3, 11, 3.) These words are mentioned here and not below in the section of ánumásikya within the word, no doubt, because they were considered in the relation of Sandhi.

In the five previous cases, when *n* disappears, or becomes either repha or úshmá, the vowel preceding it (pûrvas tat sthánát) is said to become nasal.

N. B. These are the Sandhi of *n* peculiar to the Veda. As for the remaining changes of *n*, for example, before *l*, as well as for *m* being changed to anusvâra, the same rules are given, which are also met with in Pánini. As the latter leaves it optional to adopt in these cases a lopa of *n* and *m* and to change the upadhâ to a nasal, or to preserve the pure vowel, and to chose the change of *n* and *m* in Anusvâra, so we find both opinions in the Prátiçakhyas. The first and third adopt the former, and the second the latter. According to the second (3, fol. 40, b.) Kasyapa and Cákatáyana permit the use of the lopa, and Aupaçivi adopts the nasal sound of the upadhâ before a vowel, and the

anusvára before a consonant. The third Prátiçákhyá also mentions expressly the different opinions (II. 3.)

In quite another chapter (XIII. 2,) viz. in that of the pronunciation, and in the immediate annexation to the varnátma gunaçastram, the first Prátiçákhyá treats the Anusvára *within* the word (anan tasthan anusváram) which Vyáli (XIII. 4,) calls *násikya* or *anunásika*, and mentions also in that place those cases in which the Anusvára follows a long vowel.

These are—

(1.) The *Anusvára* in the plurals of neuter nouns ending with *ashma*, before the termination *si* and *shi*, for example *chakshúshi*.

(2.) The *Anusvára* before the terminations *sa*; *sá*, *san*, *sam*, if no *námî* precedes it, but a *y* or *v* not produced by means of Sandhi; for example: *vidvásan*.

(3.) In the words *gighásan*, *pásûre*, *másam*, *pumásam*, *paúsyam*.

(4.) In the prâçlishta sandhi (coalescing of two similar vowels) example: *âbhútâcas*, and in the abhinihitâ sandhi (Elision) *havámahê homucham*; and lastly,

(5.) In the words *mâçchatve* and *ayásam*.

N. B. The third Prátiçákhyá is very explicit in the enumeration of the Anusvára within the word, without however containing any thing worth remarking except the following passage, of whose explanation however I am not quite certain, since I have not the commentary to it: (II. 4.) Akáre'károkárá: *si-shi-pará*: *pádantayo*: *vikrite'pi anákáro hrasva Sánkrit yasya*. The last sentence cannot well otherwise be completed than: *an-ákáro'nusváro* (or *svará*) *hrasva anunásiká ápadhyate Sánkrit yasya matena*. The opinion of the grammarian Sankritya would accordingly be, that among the neutral roots in *s*, only those in *as* before the plural termination of the first and second cases had the double augmentation by inserting the nasal sound, and the elongation of the vowel of the final syllable, while the others pointed out but the first, and accordingly for instance *havíshi* must be formed.

2. The euphonic *Anunásikya*.

In the second Pañala of the first Prátiçákhyá (6, 7.) which treats of the Sanhita of the vowels, we meet with the following section under the *Adhikára "prakrityā"*.

Svare pádádá udaye sacheti, shv-antâ g'osha charshaniç charshaniçhya: !

Ekárántá mitrayor asmad ívan (?) namasyur ity upadha chey
aprikta : ||

Ekaraukára-paraucha kanthyau Luchád arvág, Gotame chámínta !
Vibhvá dhartá vipanyá kadáyá mätety rikáre, 'py apádádibhági ||
Paruchepe bhishá pathety akáre, evá agním Atishu sá plutopadhá : |
Sacádayo yá vihitá vivrittaya : plutopadhás tá anunásikopadhá. ||

Before the vowel beginning with a Pada, the word *sacha* remains unchanged (Rik I. 10, 1, mandishta yad uçane Kávye sacá Indro.. ; X. 2, 4, so chin nu vrıstir yúthyásá sachá Indra..) ; further, the particle á after the terminations shu, and e, as well as after the words charshanís, charshanibhya : mitrayor, ivan (?) namasyus. Examples are : Rik IX. 7, 7, 4, ag'ig'ano amrita marthyeshvá ritasya dhar mann amritasya cháruna : ; III. 3, 5, 2 : áyáhi pûrvírati çharshanír á aryá áçisha ; to ekárántam probably, for example : V. 4, 4, 1 ; ámenyasya ragaso yad abhra á apo.

Further the vowels a and á in the hymns which precede those of Luça (Rik X. 3, 6, 7;) remain further unchanged (at the final Pada) before e and o ; examples : Rik I. 7, 3, 4, Ghanená ekaç charan.... ; I. 16, 8, saváya evá ; . II. 2, 3, 2 ; tasna etá bharata tad va çayá esha Indro.. ; IV. 4, 3, 2. sukrityayá yat svapasyayá chá eka.... ; (X 3, 5, 5. nyup- taç cha babhravo, vácām akratá emíd eshá nishkritá gáriniva.)

Further, with the Rishi Gotama, the word aminanta (here we may adduce the following apádádibhági, for the passage I. 13, 6, 2 says : á te suparná aminantá 2 evai :)

Further, also in the middle of the Pada, the words vibhvá, dhartá vipanyá, kadá yá (or ayá?), mätá before the vowel ri (for example, Rik IV. 4, 4, 6, vibhvá ribhavo yam ávishu : | II. 3, 6, 4 ; pra sim ádityo asrigad vidhartá ritá sindhavo varunasya yanti (here also in the metre), the same. IV. 1, 2, 12, pra çardha ártta prathamá pipanyá ritasyo.. ; agne kadá ritachit apa yá mätá rinuta vrágá go :|)

With Paruchepe also the words bhishá and pathá before a (I. 19, 7, 6. ghrinána bhishá adrivas ; ibid. 3, 9 ; jáhi pathá anehasá. In the Atri hymns (i. e. in the 5th Mandala) evá agním, with pluta of the first vowel (V. 2, 11, 18, evá agním vasúyava : | V. 1, 6, 10, evá agním agur.... | The commentator gives an example for the contrary from the Vasishtha Mandala.)

In all cases (pointed out here by *sacha*) of the meeting of two vowels, the first becomes pluta and anunásika.

N. B. The second Prátiçákhyá mentions this case only in so far as the Anunásika before vowels is spoken of in general terms; the third however has the following passage (II. 3,) apragrahá: samánáksharány anunásikányekesham padácha plutá cánkháyana-kándamáyanayo: akárastu sáhitáyám api sarvam ekayama púrvvesháin! “The vowels a, i, u, with the corresponding long ones, (when they meet in vivritti) unless they are pragrihya, become nasal, after particular teachers; in the Padapátha the plutá becomes nasal according to Cánkháyana and Kándamáyana, a, however also in the Sanhitá. According to the opinion of the Púrvavágñika every single vowel becomes nasal.” The latter would then relate to the pronunciation in the recitations and hymns of the sacrifice. I do not know, how to explain the ekayanam in any other way than to identify it with the aprikta of the other Prátiçákhyas.

Pánini also recognises the nasal sound, which I have distinguished as the euphonic one, in the Sútras VI. 1, 126, as being the particle á, and in the very general rule VIII. 4, 57. I confess, that I cannot conceive, what the latter is to say, as it is there without any further explanation, (Böthlingk also has not explained it.) Does the avasáne mean: “at the end of a word” or “at the end of a páda” or “at the end of a sentence?” The examples of the commentators do not notice it at all. I suppose the latter, and refer it to the elongation of the vowel which terminates the sentence, in ceremonies of sacrifice and similar things. As the mixed vowels were generally elongated by separating their elements, (for example Aitareya Bráhma. II. 7, at the end of a praisha adhrigá 3, u instead of adhrigo,) so a somewhat nasal sound would have been necessary for the elongation of the single vowels. In fact I would in general give the same signification to the Anunásikhyá which is not the substitute for a real consonant. It would only have served to point out the vowel, which was to be elongated with particular emphasis and to be protected from coalescing with the following one. That the nasal sign was chosen for this purpose, was by no means without foundation, in so far as the vowel, which is lengthened and pronounced in full, easily assumes a nasal sound; the anunásikya was here so much the more fit, as according to the Indian grammar it does not in fact express any thing belonging to a consonant, but only a quality of the vowel. The calculation of the latter in the measure of

the syllable speaks here especially in favor of the latter. The first Pratiçakhya (XIII. 3) says : hrasvám ardha-svara bhakt्या samáptám anusvárasyopadhám áhuryeke anusvárá távataivádhiká hrasvopadhá dirghapúrva tad-únam. "According to some authors a half mora is wanting to a short vowel preceding an anusvara ; the anusvara following it is added with the same measure (of half a mora) ; a long syllable before the anusvara is in the same proportion shorter," i. e. while the syllable has originally two mátrás, one and a half only belong to it in this case, the other half is kept in the anusvara ; the short syllable in the same manner has but half a máträ in the vowel and half a one in the Anusvára.

But that the Anusvára is in reality nevertheless a consonant, requires no proof, and the Indian prosody treats, notwithstanding that measurement, the short syllable with Anusvára as being long in every place, which is only possible by a sanyoga. The Anusvára also has, according to the above, just the measurement of a consonant, i. e. half a mora (Prat. II. 1, 6, 7. b. vyanganam ardhamáträ.) It will of course only be possible to give a perfectly sure statement of this, if we know from other sources this system of the measurement of single sounds and their time in rhythm, of which Pánini does not instruct us.

In conclusion, I make use of the above laws for the Anunásikya in Veda for explaining a passage of the Rik. In Rik I. 9, 7, 6, (hymn 50, 6,) Rosen has :

Jená pával'a chakshasá bhuranyantá ganâ anu !

Twá Varuna paçyasi.

Rosen translates no doubt according to Sáyana : quolumine lustrans ! terram homines sustentantem intueris, protector !

He consequently supposes ganâ to be the accusative of the plural, and the nasal sound of the á would be regular. But it is quite impossible to find in the accusative masculine bhuranyantan, a terram nutricem, or any thing similar. Besides I doubt, that in the Vedas one can meet with a passage in which bhuranyati has the signification which was put to it in the later grammar, namely : "preserve, nourish" (s. the *gana-kandvádayas*). On the contrary, it is brought forward in the Nai-ghantuka, II. 14, among the gati karmánas, and the adjective bhurangu among the kshipra námáni (Naigh. II. 15, Nir. XII. 22.) The latter is at the same time the denomination of the eagle or

falcon (çakuni. Nir. 1, c. u. Sáma II. 11, a. 13). *Bhurana*, a predicate of the Açvin; for example: Rik I. 17, 2, 11; X. 2, 13, 1, (explained by Rosen with *sustentatores*). This predicate is explained by Durga (to Nir. VI. 28,) as meaning *bhartārau cíghrau vā*, and this denomination "the fast ones," appears to be more fit for those divinities with horse and chariot than *sustentatores*. Lastly, he explains the bhuranyantam of our passage (to Nir. 12, 22) with *kshipra gachantam*. The word, according to my opinion, means "to stir up" (incitare) and in a medial sense "to be on the alert, to be active," so for example Rik IV. 3, 6, 3, *srigad yad asmá, ava ha kshipag gyá kriçánur astá manasá bhuranyan*, "when the well hitting (?) marksman discharges (his arrows), on him the tendon he flings with an active mind," i. e. seizing the moment. V. 6, 1, 6, *gharmá yad vám arepasá, násatyá, 'sná bhuranyati*, "when he stirs your pure flame, Násatyá, with the mouth" (breath); thus bhuranya is also said of the fire. I. 12, 4, 1, *çrīmann upasthád divá bhuranyu : sthátuç charatham aktún vyúrnot* "boiling he rises towards heaven, nimbly (whirling) he uncovers all that is firm and moveable, he uncovers the nights." I further suppose *ganá* to be the accusative singular, and translate, "With the splendor, with which thou, oh purifying God, surveyest the active human race thou walkest through the heavens, &c." A long syllable was indispensable in that passage of the verse; *ganam* became *ganám* according to the elongations so frequent in the Vedas; and *ám* was treated as, according to the above laws, *áu* would have been treated; the long vowel turned *anunásika*. It is worth remarking that the very exact Vedaic MS., 129, E. Ind. II. has *ganá* as well in verse 6, as in verse 3, and the same hand, which put the accents with red color to the writing, has also added the long vowel. There is also herein a pointing out the origin of the *á*, which I first supposed. The word *ganá* is besides used mostly collectively in the singular *exemp. gr.* Rik IV. 1, 9, 1; *á devayum ganá*. Sáma I. 1, 3, *manúshe gane* 10, 6; *Swadhvará ganá*, Rik V. 1, 11, 1, *ganasya gopás*.

THE PÁTHAS OF THE VEDA.

The Indian Grammar considered (see above) the single word as it were, torn from its union in the sentence, as the foundation of the speech; on that account the latter itself, although the observation of the laws of sound, which we call euphonic, was a necessity in

that foundation, appeared as something derived and standing in one line with the artificial union of word and sound, which are applied to the texts of the *Vedas*.

1. The *Sanhitá pāṭha* is consequently already a secondary form of speech, a coalescing of the words, according to fixed laws. The three principal processes of which the *Prātiçakhyes* treat with regard to this *Pāṭha*, are the *Sandhi*, the *Pluti*, and the *Nati*.

2. The *Kramapāṭha* is also termed *Kramasanhitá* or *Pránaśanhitá*. It has two principal forms, as I have already mentioned above.

(a.) The *Varnakrama*. The principal rules of this *Krama* are given by Pánini VIII. 4, 46 to 52, who, however, does not mention the object to which they refer; it will therefore not be necessary to repeat them here, since a more exact investigation of the same would lead us too far, which would however in general not be unimportant for the laws of sound in the Sanscrit. The first *Prātiçakhyā* devotes a separate chapter to it, viz. the sixth *Paṭala*, and in concurrence with the third (II. 2.) notices for this manner of speech the most contradictory opinions of previous grammarians. The second *Prātiçakhyā* treats of it in the fourth *adhyāya*, fol. 53, etc, as well as in other passages. Böhtlingk has printed a small section to Pán. VIII. 4, 47, from the *Vāgasaneyā Sanhitá*, which appears to have been composed according to this *Pāṭha*.

(b.) The *word krama*. It is fully explained in the tenth and eleventh *Paṭala* of the first *Prātiçakhyā*; there, however, it is called simply *Krama* and described in the following manner, dvábhyám abhikramyá pratyá-dáyottará tayo : | uttarenopasandadhyát tathárdharcá samápayet : | *exemp. gr.* the beginning of the well known song of *Vasishta* would be as follows : parganyáyá pra | pragáyata | gáyata diva : | divasputráya | putrásya milhushe | milhushaiti mílhu she. || The second *Prātiçakhyā* also gives some rules about it, and it does not appear to have been rarely made use of, although I myself have never seen a MS. composed in this *Krama* of the simplest shape. The Bodley Library at Oxford however possesses a very carefully written, accented and complete copy of the *Vāgasaneyā Sanhitá* in the *Gatápāṭha*, a more perfect exposition of the above *Krama*, in which the ardharca “uru Vishno vikramasva urukshayáya naskridhi,” is as follows : uru Vishno Vishna urúru Vishno | Vishno vi vi Vishno Vishno vi | Vishno (to)

Vishno ! vikramasva kramasva vi ! kramasvorū kramasva kramasvoru ! urukshayáya-kshayáyorū-rukshayáya ! kshayáya no na : naskridhi kridhi no naskridhi ! kridhiti-kridhi. *

However thoughtless such a repetition might be of itself, it yet possesses the value for us to confirm the text in a measure, that one MS. written in this manner does not leave any doubt (as to the text). The same in fact was also the object of Indian grammar. Nevertheless even that simple Krama which is supposed to have for its author Panchálá, the son of Bahru, does not appear to have enjoyed an uncontradicted authority. Since the Prátiçákhyá itself rejects other modifications of the Krama, it finds itself under the necessity to defend its own doctrine against the blame of being treated in an injudicious manner. No object, say the antagonists, can be gained by this Krama (Kramana nártha:) it had its foundation on the already existing Sanhita, without them it was impossible, and through them superfluous; it is also said that it was not traditionally adopted (na çrutas.) The Prátiçákhyá however, takes it under its protection against these and all other objections, and exposes its advantages in the following verses :

Viparyayác, chāstra-samádhi-darçanát, puráprasiddher, ubhayor anáçrayát !

Samabhyupeyád bahubhiç cha sá dhubhi : çruteç cha sanmána-kara : Krama 'rthaván !!

3. The *Pada-páthā*. Of this the second Prátiçákhyá treats in the fifth Adhyáya, both the others speak of it but occasionally. It has not only the object to dissolved the Sandhi, but also the Pluti, and Nati. Lastly, every Samásá is divided in its parts, and the separation (avagraha) is in the reading equal to one Mátra. In this respect it will not be unimportant for the history of the more ancient grammarians to investigate, whether the Padapáthā proceeds after the same ideas of Samásá, which Paníni gives. The principal effort of this Páthā, in general is directed to grammatical analysis, and it has been without doubt the first and most simple explanation of the books of the Vedas, at a time, in which, though the language of the same was still essentially understood; single laws of sounds had already commenced to change; the Krama readings on the contrary had in view less to explain than firmly to establish and to secure the texts.

A Fifteenth Memoir on the Law of Storms, being (PART I.) the Buckinghamshire and H. Co.'s Steamer Cleopatra's Hurricane on the Malabar Coast and Arabian Sea, of April 1847. The Hurricane of the H. C. S. Essex in June 1811, and (PART II.) some considerations on the loss of the Cleopatra Steamer, and for Steamers navigating the Eastern Seas in general. By HENRY PIDDINGTON, President of Marine Courts of Enquiry, Calcutta.

PART I.

In the month of April 1847, a very severe hurricane was experienced on the Malabar coast, in which, amongst others, the ship *Buckinghamshire* was totally dismasted and the H. C. Steamer *Cleopatra*, with convicts for the Straits is supposed to have foundered.* I addressed the Government and Chamber of Commerce of Bombay, as soon as the newspaper accounts reached Calcutta, to obtain all the information possible, and to both I beg to tender my respectful thanks for their ready compliance with my request. I further, upon receipt of the first documents, forwarded to the Government of Bombay a set of Queries specially relating to the unfortunate *Cleopatra*, and these also have been filled up (though less explicitly than I could wish) and returned to me, so that it will, I trust, be recollectcd that the remark quoted in the note below was addressed to the Government of Bombay of 1842, and not to that of The Hon Mr. Clerk in 1847. And while preparing this paper, I am farther indebted to the Bombay Government for a copy of some remarks on this storm, and a chart of its track, by Captain Carless, of the Indian Navy, who has also appended some remarks on the loss of the *Cleopatra*, having himself very properly avoided standing into the bad weather in the Sesostris, when bound in towards the coast from Aden to Cannanore. I have also to express my thanks to Captain Twynham, of the Peninsula, and ~~Oriental~~ Steam Navigation Company, for an important log from Colombo.

* Verifying too fatally I fear, my half prediction respecting her and the *Semiramis*, in a former occasion, in the eighth of these memoirs (Journal A. S. Vol. XII. p. 397), where I have had to remark as follows—"I grieve to add that, to the disgrace of those who may deserve the blame, neither the log of the *Cleopatra* or of the *Semiramis*, both Government steamers, have been obtainable; I have strong suspicions that both ran headlong into the storm circles. Is the Government of Bombay aware that a mistake of this kind might cost it a steamer, or at least half of a lac of rupees of damages?" Not long after this occurred the instance of the H. C. Steamer *Pluto*, which vessel, in the face of every warning, ran headlong into a Typhoon in the China Sea, was utterly disabled, and narrowly escaped foundering, and on putting back drifted on the rocks of Hong Kong; her repairs, apart from the loss to the public service of her assistance at Borneo, costing probably 30,000 rupees.

As in former Memoirs, I first give the documents abridged of all non-essentials, and a tabular arrangement of them, and then a summary, showing on what grounds the storm track has been laid down as it appears in the chart, and finally in a separate section some considerations on the loss of the unfortunate Cleopatra.

Abridged Log of the Ship East London. Log from Capt. Twynham of Point de Galle—Civil time.

On 13th April 1847, the *East London* was at 8 A. M. in sight of the North end of the Maldivian Islands, bearing S. b. W. $\frac{1}{2}$ W. 16 miles, which with her subsequent run, would place her at noon, in Lat. 7.21 N.; Long. 73.34. E. Bar. 29.8, Simp. 29.66,* at 10 A. M.

P. M. wind N. W. b. W., throughout strong squalls, constant rain, and heavy head sea; ship steering to the E. b. N. 5' per hour, Bar. 2 P. M. 29.74, Simp. 29.62, 6 P. M. 29.70, Simp. 29.5, 10 P. M. Bar. 29.68; Simp. 29.54. Weather increasing with heavy squalls, and *thunder and lightning*, to a gale at midnight and the ship preparing for bad weather.

14th April.—A. M. Blowing harder; 4 A. M. a hurricane from N. W. Ship sprung a leak, shipping much water and in distress, being unable to leave the pumps to secure the sails blowing from the yards. Bar. at 4 A. M. 29.5' Simp. 29.4; noon 29.5, Simp. 29.38. Lat. Acct. 7° 39' Long. Acct. 75° 04' E. Wind from N. W. to W. N. W. up to noon. P. M. wind W. N. W. Ship running to the E. N. E. before it; 8 P. M. W. S. W.; Bar. 29.54, Simp. 29.46; lost topmasts, and boats, and ship in great distress, the main hatchway being stove in. Midnight wind still more violent.

15th April.—A. M., water gaining on the pumps. Wind W. N. W. blowing extremely hard; ship making 5' per hour to the E. N. E.; 4 A. M. Bar. 29.56, Simp. 29.34; 10 A. M. Bar. 29.50, Simp. 29.4; wind and sea most furious; Lat. Acct. 8° 6' N.; Long. Acct. 76° 10' E. P. M. wind W. S. W.; 4 P. M. S. W. At 5 P. M. Bar. 29.53, Simp. 29.36; 8 P. M. Bar. 29.56, Simp. 29.38. Heavy squalls *thunder and lightning*.† Midnight Bar. 29.64, Simp. 29.40.

16th April.—Wind S. W.; 2 A. M. Bar. 29.70, Simp. 29.52; 4 A. M. gale abating, and at 8 A. M. Barometer gradually rising. Noon, weather moderate. Lat. Acct. 7.44 N., Long. Acct. 76.53 E.

* It is mentioned in a separate note that the Simpiesometer had been as low as 29.66 since the 2d of the month in calms off the Maldives.

† Noted for the first time in the log since the 13th at midnight.

Abridged Log of the Ship Buckinghamshire, Capt. McGREGOR. From the Government, and from the Chamber of Commerce of Bombay (Civil time.)*

The Buckinghamshire was at noon, 14th April, 1847, in Lat. 8° 18' N.; Long 72° 56' East; Bar. 20.85, Simp. 29.84, Ther. 81°. 4 p. m. strong breeze and cloudy from N. W. by N.; at 1.30. Minicoy bore E. N. E.; 4 p. m. wind marked Northerly, and increasing. At 1 p. m. Bar. 29.72. 2 p. m. Bar. 29.72, Simp. 29.74, Ther. 83°. 3 p. m. Bar. 29.72. Simp. 29.75, Ther. 84°. 4 p. m. Bar. 29.70, Simp. 29.69. 5 p. m. Bar. 29.67, Simp. 29.69. 6 p. m. wind N. b. E. 8 p. m. fresh gale, heavy sea from the S. E. and heavy squalls from the North; dismally dark, with the most vivid lightning. 7 p. m. Bar. 29.71, Simp. 29.71. 8 p. m. Bar. 29.70, Simp. 29.72. 9 p. m. Bar. 29.75, Simp. 29.76, Ther. 80 $\frac{1}{2}$ °. 10 p. m. wind N. E. b. East. Midnight fresh gale, constant rain and lightning. To 9 p. m. ship standing to the N. E. and E. b. N. and then to the N. W. and N. N. W.

15th April.—At 4 a. m. Bar. 29.67, Simp. 29.71, Ther. 80 $\frac{1}{2}$ °. 6 a. m. Bar. 29.71, Simp. 29.74. Daylight fresh gales N. E. b. E.; severe squalls and a heavy sea; ship standing to the N. b. W. to noon, when Lat. Obs. 9. 1. N., Long. 73.4. E., Bar. 29.67, Simp. 29.72, Ther. 81 $\frac{1}{2}$. p. m. wind N. E.; ship standing to the N. W.; Bar. 2 p. m. 29.64; at 4, 29.64; at 6, 29.71; at 8, 29.72; at 10, 29.73; midnight 29.69. Simpiesometer and Ther. 2 p. m. 29.72, and 81° at 4; 29.71, and 81°; at 6, 29.71, and 81 $\frac{1}{2}$ °; at 8, 29.71, and 81°; at 10, 29.73 and 81 $\frac{1}{2}$ °; midnight 29.70 and 81 $\frac{1}{2}$ °.

16th April.—A. m. strong gale N. E. b. N. and at noon a hard gale from the same quarter; ship standing to the S. E. b. E. Bar. 2 $\frac{1}{2}$ a. m. 29.58; at 4 $\frac{1}{2}$, 29.51; at 6, 29.51; at 8, 29.60; at 10, 29.58; at noon, 29.53. Simpiesometer and Ther. at 2 $\frac{1}{2}$ a. m. 29.60, and 80 $\frac{1}{4}$ °; at 4 $\frac{1}{2}$ a. m. 29.55 and 81°; at 6, 29.54 and 81°; at 7, 29.61; at 8, 29.63 and 81°; at 10, 29.61 and 82°; at noon 29.57 and 81 $\frac{1}{2}$. Lat. by Acct. 8.14 N., Long. marked as 73.3, East. p. m. wind N. E. b. N., fresh gales and rain, with a high sea. 3 p. m. wind North; 5, N. b. W. $\frac{1}{2}$ W.; 9, W. N. W. Sunset hard gale. Midnight hard gales, constant light rain, and lightning to the northward. [N. B. wind now was about West, being marked W. S. W. at 2 a. m.]

* There are a few more details in the one than in the other, and I have inserted what was essential from both, with notes from Capt. McGregor's private Log.

Vessel standing from $3\frac{1}{2}$ knots to the E. S. E. to 8 knots to the N. E. b. E.

17th April.—2 a. m. wind W. S. W.; Bar. 29.58; Simp. 29.60; Ther. $81\frac{1}{2}^{\circ}$; daylight fresh gale, S. W. by S. 8 a. m. South; 9, S. Westerly. Course from N. E. to N. $\frac{1}{2}$ E., 8 to 9 knots. At 8 a. m. set the main topgallantsail, Noon fresh gales; Lat. $10^{\circ} 20' N.$; Long. $75^{\circ} 5' E.$ p. m. ship running 11 and 12 knots to the N. N. W.; wind S. b. W. $\frac{1}{2}$ W.; strong gales, thick weather and furious squalls.

18th April.—To noon, ship running as before, 11 and 12 knots to the N. N. W. and N. W. b. N.; 2 a. m. in maintop gallant sail; by daylight passed the Mermaid with ensign inverted; threatening weather and all the glasses falling; but their register lost. Noon, gale increasing; wind marked S. E. at 11 a. m. Noon Lat. ascertained from Capt. McGregor's log $14^{\circ} 10' N.$; Long. $72^{\circ} 59' E.$ Gale increasing to an extraordinary degree, maintopsail blew away; kept the ship before it. p. m. cut the foresail from the yard; foretopsail blew away; at 0.30 p. m. ship broaching to, cut away the mizenmast and kept her before it. Blowing a hurricane, maintopmast blew away, foremast *bending** to its force; 1 p. m. foremast went and a furious gust *blew away the mainmast* near the deck. The quarter boat blew away, the large cutter flying across the poop. The violence of the wind indescribable, every thing exposed to its fury being blown away. The poop ports having blown in the violence of the wind blew down the Cuddy bulkheads, destroying the Barometers and every thing in all the cabins; a very high sea on, covering the ship with spray. The ship labouring excessively and every thing on all the decks adrift and destroyed, cargo as well as stores, as far as could be seen; crew unable to stand on their legs or to hear one another, and exposed to great danger from the stunning force of the wind. The fore and main and mizen masts got under the ship's bottom, at the same time, endangering the rudder; all violently tearing off the copper.

At 2 p. m. the wind, which had been for the last half hour indescribably furious, fell suddenly calm; but the Sympiesometer indicated no favourable change, continuing as low as 28.08. During the calm got the whole of the weak cut clear away; ship covered with aquatic birds, thousands of them dying on deck. 4 p. m. the hurricane that had died away at E. S. E. commenced with equal violence at

* This is a remarkable indication of the extreme fury of the wind. It would appear from what follows that both (sound) masts were *blown out* of the ship while scudding 12 knots! The expressions used are those of the log.

W. N. W.; the ship became again enveloped in the sea, and labouring with extreme violence which nothing could resist. Hurricane abating at 10 p. m. Sympiesometer 28.96, wind still from the West. The carpenter having gone down the pump-well found $3\frac{1}{2}$ feet water in the ship. Midnight more moderate; Sympiesometer 29.10; ship's head to the S. S. E. with the wind from the westward.

19th April.—Daylight moderate winds from the westward with rain; ship unmanageable, with her head to the S. E.; sounded in 30 fms. and shortly after sighted the Vingorla rocks bearing N. E. $\frac{1}{2}$ E., Noon squally. At 7.30 p. m. came to in $9\frac{1}{2}$ fms. off the rocks of Vingorla.

Abridged Log of the Ship Faize Rubany, Capt. SARGEANT, from Bombay to China. Civil Time. From the Government of Bombay.

The *Faize Rubany* was at noon 14th April 1847, in Lat. $12^{\circ} 57'$ N., Long. $75^{\circ} 16'$ E., by her log worked back from the 16th with moderate breezes from the westward up to midnight.

15th April.—A. m. breeze declining to calm at noon, with a confused sea, when in Lat. $11^{\circ} 55'$ N., Long. $76^{\circ} 08'$ E., by account back from the 16th as before. P. m. wind S. E. b. S.; hazy weather, ship standing to the southward against a heavy head swell and sprung the mainmast at 6h 30; to midnight blowing strong with a high sea.

16th April.—A. m. to noon, wind variable to the S. E., moderate gale and very high sea. Noon Lat. $11^{\circ} 19'$ N., Long. $75^{\circ} 32'$ East. P. m. wind E. S. E., strong gale, high sea, ship pitching very deep; 7 p. m. wind veering to eastward; 9 p. m. east; midnight hard gale, veering towards the S. E.

17th April.—A. m. wind S. E., very heavy gale, with tremendous high sea; 6 h. a. m. having been struck with a very heavy sea, found the ship making water; 7 a. m. bore up before the wind to the N. N. W. noon very hard gale, Lat. Acct. $11^{\circ} 35'$, Long. $74^{\circ} 54'$ E.; p. m. wind S. S. E., heavy gale and violent squalls; 8 p. m. S. E. to midnight.

18th April.—3 a. m. broached to, damaged the rudder and till noon ship in great distress,* lying to from 7 a. m. Blowing excessively hard from the S. E. Lat. Acct. 13.24 N., Long. $74^{\circ} 27'$ E. P. m. wind south. At midnight less wind; sounded in 30 fms.

19th April.—Daylight made the land between Cape Ramos and George's Island; noon at anchor, in Lat. $15^{\circ} 19'$ N., off the coast about this part.

* At 6 a. m. the ship *Mermaid* passed her.

Abridgment of a journal of the Ship Mermaid, signed by her commander Capt. J. B. ROGERS, and officers; the Log Book being lost with her. (Civil time.)

The ship *Mermaid* was bound down the coast, and having sprung a leak was finally beached a letter below Vingorla.

16th April.—P. m. ship standing to the S. E. with the sea breeze, in from 18 to 26 fms. At 5 p. m. Mangalore east 8 miles. Midnight fresh land breeze and hazy.

17th April.—A. m. Barometer 29.81; by 8.30 fresh gale and squalls. At noon an increasing hard gale about S. E. in 35 fms. Bar. 29.60.; No observation. Vessel leaky; 3 p. m. Bar. 29.50, 1 to 5 wind S. E.; 6 South; at 4h cut away mizenmast. 4h 30 put back for Bombay; 5 p. m. Bar. 29.42, heavy gale and cloudy, ship running to the N. W. and N. W. b. N. to midnight.

18th April.—A. m. Heavy gale with thunder, lightning and rain. 4 a. m. Bar. 29.36. Noon 29.34, and in 28 fms. water. No observation. P. m. steady fresh gale W. S. W., ship running to the N. N. W. 4½ and 5 knots. Barometer 29.38. Sunset passed a large ship (the *Buckinghamshire*;) Bar. 29.38; by 6 p. m. wind W. by S.; severe squalls, thunder, lightning and rain; midnight in 29 fms.

19th April.—A. m. More moderate; 4 a. m. wind west, and at noon obliged to beach the ship for the safety of lives and cargo.

A letter from the Collector of Mangalore, forwarded by the Bombay Chamber of Commerce, says that—

“The gale set in on the 16th from the S. W. or regular monsoon quarter, and was at first supposed to have been an unusually early commencement of the rainy season. It continued for about three days,* accompanied with torrents of rain, veering round, at particular points of the coast, to all quarters of the compass.

Extracts from various logs of coasting vessels. From the Government of Bombay.

The ketch *Ceylon Island* was on the 12th April within 25 miles of Colombo, but was blown off by a smart gale from E. S. E. She then stood in for Colombo, and on the 15th (Nautical time) got the wind blowing “tremendously” from S. E., which on the 16th blew away her topmasts and all her sails, while running before it to the N. W. This continued on the 17th, also from S. E. On the 18th, Lat. Obs. 9°14'. N.

* Italics are mine.

19th severe gale about S. W. and very heavy sea. Vessel running to the N. W. b. N. Indift. observation 11.11 N. 20th. Heavy S. W. gale ; Lat. 12° 42' North.

The *Pattamar Labsavoy* was off Faizud (Zyghur ?) river on the 17th. On the following day it commenced blowing hard from the East, and in the middle of the day the wind blew in a heavy gale with a tremendous sea ; at 5 p. m. the wind shifted to the S. E. with heavy rain. We were then at anchor near the river and put in for shelter.

A lascar of the Pattamar Towenully, from Alleppey, states, that on the night of the 17th, when near Dewghur, they experienced a heavy gale which commenced from the east and on Sunday morning they put in to Radjapore river.

Abridged Log of the Bombay Steam Navigation Companys Steamer Victoria, from Bombay to Colombo. (Civil time.) From the Government of Bombay and Chamber of Commerce.

16th April 1847.—The *Victoria* was at 3.45 a. m. with Mangalore Light bearing East. At 8 all possible sail with wind easterly, and at noon a fresh southerly wind and cloudy weather with a heavy swell. Lat. Obs. was 12° 15' N. and Mount Dilly bearing S. E. b. S. p. m. to midnight wind S. Easterly and E. S. Easterly ; at 10 p. m. anchored off Cannanore. Heavy swell, surf increasing and continued rain from the S. E.

17th April.—Increasing surf. Wind about E. S. E. and increasing, by 4 a. m. surf breaking over the vessel and large rollers striking her heavily ; 6½ a. m., stood out to sea. Wind E. S. E. Bar. 29.75 ; stood out S. S. W. till 9 a. m. Noon, gale increasing. Steamer *Hugh Lindsay* in company. 2 p. m. Bar. 29.70. Threw some cargo over board. Heavy gusts of wind, and constant rain ; wind S. S. W. 10 p. m. Bar. 29.68. Midnight strong S. W. b. S. gales and tremendous sea.

18th April.—a. m. wind southerly, strong gales ; Bar. 29.70. 8 a. m. moderating ; noon fresh breezes South. Bar. 29.90. ; p. m. heavy squalls again from S. S. W. ; swell increasing.

19th April.—a. m. hard squalls ; wind S. E. 6 a. m. wind S. S. W. 4 a. m. in 15 fms. water ; 8 a. m. Mangalore flagstaff S. E. b. E. 11 a. m. engines making only six revolutious per minute and side rods bent ; came to off Mangalore in 6 fms. water. Noon hard squalls. On anchoring found a strong set to the northward. Winds Southerly. Midnight Bar. 29.92 ; strong Southerly squalls.

• 20th April.—Wind was S. b. W.; at noon W. S. W.; at 2 p. m. got under way for Cannanore, and at midnight she still found the current setting strong to the northward.

The ship Atiet Rohoman, Capt. S. Steward, lying at Alleppey. Civil Time, from the Chamber of Commerce.

On 14th at 5 p. m. came to with the flagstaff bearing E. by S. 3'. Wind E. S. E.; 15th 2 a. m. heavy squalls from S. S. E.; 8 a. m. wind easterly. Noon moderate at N. E. b. E.; 2 p. m. N. E. b. E.; 4, E. N. E.; 6, East; 10, E. S. E.; 12, S. E. moderate breezes and drizzling rain. Midnight dark and cloudy.

16th April.—Cloudy and rain to noon; 2 a. m. wind S. S. E.: 4, S. E.; 6, E. S. E.; 8, East; 12, E. N. E.; 2 p. m. wind east; 4, E. S. E.; 8, S. E.; midnight E. S. E. having increased to a strong breeze with heavy squalls.

17th April.—To noon the same wind from E. S. E. to S. E. and South; 2 p. m. S. b. E. strong gales, rain and heavy sea; 4 p. m. S. S. E. to S. E. b. S.; 12, S. E.; midnight heavy gusts and sea.

18th April.—More moderate, noon dirty weather, wind S. b. E.; 6, South; midnight S. S. E. after which the ship shifted her birth further in shore.

No Barometric observations are given.

Abridged Log of the H. C. Steamer Sesostris, Captain CARLESS, from Aden to Cannanore, with troops. Civil time. From the Government of Bombay.

16th April.—A. m. wind N. N. E., N. by E., and N. N. E. again; ship running east 7 and $7\frac{1}{2}$ knots per hour; a long S. Easterly swell. Noon, Lat. $13^{\circ} 15' N.$ Long. $70^{\circ} 28' E.$ p. m. wind N. N. E. Course the same to midnight. Lightning to the eastward, and vivid lightning to the eastward and southward are noted.

17th April.—1.40 a. m. taken aback by a hard squall from the East. Soundings 1 to 2. 17 fms. to 30, no ground; to noon. Wind N. E. to North, N. N. E., and E. N. E. at noon, when Lat. Acct. 13.28. N., Long. Chr. $72.7\frac{1}{2} E.$, 1 p. m. wore to N. W. Wind N. E., stood back to midnight, going from 1 to 3 knots; moderate gale and heavy sea with hard squalls.

18th April.—Daylight decreasing breezes 8 a. m. stood again to the E. N. E., wind being from N. N. W. a. m. to 7 a. m., and North to

noon when Lat. $13^{\circ} 52'$ N. Long. $71^{\circ} 13'$. p. m. squally from North, and at 6, W. N. W., with heavy swell throughout.

19th April.—Squally weather, with winds from W. S. W. and W. N. W.; noon Lat. 13.28 , N. Long. $73^{\circ} 14'$. Gradually making sail and standing in for Cannanore.

At the Laccadive Islands.

By an account obtained from Capt. Young of the H. C. Steam Frigate *Auckland*, and published by Captain C. Biden, Master Attendant at Madras, in the Madras *Spectator*, it appears that at Minicoy the gale was not very severe, but at Kalpeni and Underoot, where it is stated to have been most violent from the S. East, the sea made a fair breach over the Islands, and about 250 of the inhabitants were swept away, all the cocoanut trees uprooted or cut asunder by the violence of the storm

I now add a Log of much interest, as will be subsequently shown, being that of the H. C. S. *Essex*, in June, 1811.

HURRICANE OF THE H. C. S. ESSEX.

Abridged Log of the H. C. S. Essex, Capt. NISBETT, 3rd to 6th June, 1811. Reduced to Civil time.

The H. C. S. *Essex* bound to Bombay, was on the 3rd June at noon in Lat. $16^{\circ} 38'$. N., Long. by Chr. $69^{\circ} 32'$ E., with light breezes from the north and fair weather. p. m. the same, freshening with cloudy threatening weather, and “*a high confused agitated sea breaking in all directions*;* 5 p. m. wind N. E.; 10 p. m. lightning to the S. W.

4th June.—1 A. m. wind N. N. E.; 5 A. m. striking topgallant yards. and pitched away the foretopmast. 7 A. m. increasing to a hard gale. Hove too under bare poles. 9 A. m. wind marked N. E.; noon, hard gales; thick haze, much lightning and heavy rain; Lat. Acct. $16^{\circ} 19'$ N., Long. Acct. $70^{\circ} 12'$. p. m. wind about N. N. E.; at 6 p. m. about N. b. E blowing a hurricane to midnight.

5th June.—1 A. m. lost main and mizenmasts. 5 A. m. the wind (hitherto about N. by E. from the ship's coming up and falling off) shifted suddenly to N. W., and at 8 A. m. to W. S. W., also in a sudden shift with a tremendous squall. Ship quite ungovernable. By noon moderate; p. m. wind marked W. S. W., and at 4 p. m. clearing up.

From the best consideration I can give to the log of this vessel, aided by a private letter to me on the subject of the flaws and shifts

* The italics are mine, I shall allude to this passage in the remarks.

of wind in hurricanes, by the late Mr. Greenlaw, in which this hurricane is described, I should assign to it a track of about from the S. S. E. to the N. N. W., but it may have been half a point more or less one way or the other; for as usual, it was found, I suppose, impossible (and we thought it in those days of no consequence, as most now do) to note with any exactness the wind before the shift; which I have deduced from her coming up and breaking off. This storm however, occurring as it did within so short a distance of that of the *Cleopatra's* under consideration, is a full confirmation, if any doubt could exist of the tendency of the tracks to follow a parallel line with the coast, and thus affords us, with the present storm a most valuable guide for the future estimates of tracks in this very frequented sea.

In reference to what is here said of the tracks and of their apparent tendency to follow the line of the coasts, it would appear that at Bombay also, as well as farther South, they certainly at times do so; for on the 14th June 1837, a most severe and destructive hurricane was felt at that port, in which the losses in property alone were computed to amount to twenty-five lacs of rupees, some fifteen or sixteen vessels being driven on shore in the harbour and many of them totally wrecked, besides numbers of native craft and boats. It is stated to have been the most severe storm experienced for half a century. It is said that the wind which began to blow "a gale" from the East, veered to S. E., at which point it increased to a "perfect hurricane," which lasted for an hour, and then shifted* to S. S. W., from which quarter it continued to blow "with extreme violence" during the greater part of the day till it abated.

The foregoing is abridged from the newspaper accounts, and is distinctly a hurricane, with the shift from S. E. to S. S. W., which would indicate a track from S. 12° *East* to the N. 12° *West*, and I have so placed it on the Chart.

I now place in a tabular form the wind and weather experienced by the different vessels in the *Cleopatra's* hurricane from the 13th to the 17th April, so as to enable the reader to see at a glance the winds and weather on any particular day, and shall follow it with the details of the data and considerations from which the track of the storm is laid down on the Chart.

* This word is always important, for it marks the passage of the centre without a calm interval.

Comparative Table of Winds and Weather from the 13th to the 17th April, 1847, and from Lat. 7° to 15° N., and Long. 71° to 77° E.

Date and Time.	Name of Ship or Station.	Lat. N.	Long. E.	Winds and Weather.	Bar.	Ther.	Simp.	Remarks.
Noon, 13th April 1847.	East London.	7.21	73.34	N. W. b. W. throughout; strong squalls constant rain and heavy head sea. Gale at midnight with heavy squalls, thunder and lightning.	29.8	....	29.66	Barometer falling from 29.74 at 2 P. M. to 29.68 at 10 P. M. Simp. 29.62 to 29.54.
	Buckinghamshire.	6.53	70.45	P. M. fresh and variable breezes. N. by W. to W. N. W.	....	....	....	Studding sails set. Midnight squally, rain & lightning.
Noon, 14th April.	East London.	7.39	75.64	4 A. M. hurricane from N. W. Wind N. W. to W. N. W. to Noon. P. M. W. N. W. to W. S. W.	29.5	....	29.38	(4 A. M. Bar. 29.5; Simp. 29.4. 8 P. M. Bar. 29.54. Simp. 29.46.
	Buckinghamshire.	8.18	72.56	A. M. increasing breeze and fine. W. N. W. to N. by W.; 2 P. M. strong breeze and cloudy from N. W. by N. Midnight fresh gale from the northward.	29.85	81°	29.84	1 P. M. Bar. 29.72; 9 P. M. 29.75; 2 P. M. Simp. 29.74; 9 P. M. Simp 29.76; 6 P. M. vivid lightning.

Date and Time.	Name of Ship or Station.	Lat. N.	Long. E.	Winds and Weather.	Bar.	Ther.	Simp.	Remarks.
	Faize Robany, . . .	12.57	74.20	P. M. moderate breezes from the westward to midnight.				
	Atiet Bohoman at Allepee,	....	....	Wind E. S. E. fine, ..	....	....	....	At 5 P. M. anchored at Allepee.
Noon, 15th April.	East London, . . .	8.06	76.10	W. N. W. blowing extremely hard. Noon 29.56 A. M. most furious; P. M. 10.29.50 W. S. W.; 4. S. W.	4 P. M. 5	29.56 29.53 8. .56 12.—.64	.... .... .... ....	29.34 Thunder & lightning noted for the first time since the 13th. 29.40
Buckinghamshire,		9.1	73.4	A. M. Fresh gales N. E. 4 by E. ; P. M. N. E. 4 A. M. 29.67 Noon 67 P. M. 2 h. 29.64 Midt. 69	80 $\frac{1}{2}$ 81 $\frac{1}{2}$	29.36 29.38 —.40	....	A. M. Ship standing to the N. W. 29.71 —.72 P. M.
	Faize Rubany, . . .	11.55	75.04	Noon calm and confused swell. P. M. Wind S. E. by S.; from 6 P. M. blowing strong with high sea.	81 81 $\frac{1}{2}$	29.72 —.70	....	Ship standing to the southward.

Atiet Rohoman, at Allepee,	....	....	2	A. M. heavy squalls	29.52	At 8 A. M. Barome- ter gradually ri- sing.
				S. S. E. 8 A. M. E. Noon moderate, N. E. by E.; 4 E. N. E.; 6 East; Noon S. E. Moderate and driz- zling rain. Midnight dark and cloudy.		
Noon, 16th East London, April.	7.44	76.58	A. M. wind S. W.; 4 A. M. gale abating Noon moderate. P. M. wind S. W. by W	2.29.70	....	29.60 —.57
				A. M. strong gale N. E. b N.; noon hard gale; P. M. the same; Noon. 53 3 P. M. wind N., 5 N. b W. $\frac{1}{2}$ W.; 9 W. N. W. Midnight, about West, hard gales, thunder and lightning.	80 $\frac{1}{4}$ 81 $\frac{1}{2}$	Vessel first standing to the E. S. E., and then running 8 knots, to N. E. b E. Barometer not marked P. M.
Buckinghamshire,	8.44	73.3	To noon moderate gale, variable to S. E. with heavy sea; P. M. E. S. E. strong gale; 9 P. M. East. Midnight hard gale, veering to S. E.	....	....	Very heavy sea throughout.
			
Faize Rubany,	11.19	75.32	To noon moderate gale, variable to S. E. with heavy sea; P. M. E. S. E. strong gale; 9 P. M. East. Midnight hard gale, veering to S. E.	....	....	....

Date and Time.	Name of Ship or Station.	Lat. N.	Long. E.	Winds and Weather.	Bar.	Ther.	Simp.	Remarks.
	Mermanid,	....	....	At midnight fresh breeze and hazy,	....	....	....	At 8 P. M. Mangalore East. N. B. This ship's log being lost with her, the notes are from a journal only.
	Victoria Steamer,	12.15	....	At 3 A. M. Mangalore Light East; 8 Wind Easterly; p. m. continued rain from the S. E.	....	....	....	10 A. M. anchored off Cannanore.
	Atiet Rohoman, at Alleppey,	9.30	76.24	S. S. E. to East, and S. E. Midnight increased to strong breeze with heavy squalls.	....	....	....	Ship running to the East 7 & $\frac{7}{4}$ knot A long S. Easterly swell. Lightning to East and S. Eastward.
	H. C. Steamer Se sotris.	13.15	70.28	A. M. wind N. N. E. p. m. N. N. E.	....	....	....
10.20	75.5	2 A. M. wind W. S. W.	2. A. M.	81 $\frac{1}{2}$	29.60	No log of the East London this day, she having fair weather.		
17th April.	Buckinghamshire.			daylight fresh gale, S. W. by S; 8 A. M. S. 9 S. W.; 8 P. M. S. by W. $\frac{1}{2}$ W., Strong gales, thick weather and furious squalls.	29.58			

Faize Rubany, . . .	11.35	74.54	The wind S. E., heavy gale P. M. S. S. E. 8 p. m. wind S. E. Very hard gale and tremendous squalls.	Very heavy sea throughout; sprung a leak at 6½ A. M.; 7 A. M. bore up to the N. N. W.	At anchor at Cannanore, and standing to sea at 6½ A. M.	Standing back to the N. W.
Mermaid, . . . . .	....	....	Noon increasing hard A. M. gale, about S. E. to 5 P. M., S. E.; 6 South. Noon 60° [3 P. M. 50° [5 P. M. 42°	....	....	....
Victoria Steamer at Cannanore,	11.52	75.26	4 A. M. wind E. S. E. and surf increasing; 6th. E. S. E. Noon 68° Gale increasing; 2 p. M. Heavy gusts and constant rain. Wind S. S. W. Midnight strong S. Westerly gales.	P. M. 2.29.70 10.68	To noon strong breeze and squalls, E. S. E. to S. E. and South 2 P. M. S. by E.; 12 S. E. Midnight heavy gusts and sea.	....
Atiet Rohoman, at Allepee,	9.30	76.24			Wind North to E. N. E. at noon; P. M. N. E. Moderate gale and heavy sea.	....
H. C. Steamer Sesostris.	13.28	72.7			Wind back to the N. W.	....

<i>Date and Time.</i>	<i>Name of Ship or Station.</i>	<i>Lat. N.</i>	<i>Long. E.</i>	<i>Winds and Weather.</i>	<i>Bar.</i>	<i>Ther.</i>	<i>Simp.</i>	<i>Remarks.</i>
Noon, 18th April.	Buckinghamshire.	14.10	72.59	Blowing a hurricane; and at noon wind marked S. E.; 2 P. M. reached the centre with the wind at E. S. E.; at 4 W. S. W.; abating at 10 P. M.	....	....	2 P. M. 2.28.00 10.28.96 midnight 29.10	0.30 P. M. lost Mizzen-mast; 1 P. M. lost foremast and main-mast; 2 P. M. Calm lull, 4 P. M. hurricane from W. S. W.. Daylight on the 19th moderate from the W.
	Faize Rubany,	14.23	74.27	A. M. blowing very hard from S. E., P. M. South.	....	....	....	Ship in much distress; midnight less wind, and in 30 fathoms off the coast; 19th at daylight at anchor in Lat. 15° 19'. N.
	Mermaid,			A. M. heavy pale, thunder and lightning; P. M. gale W. S. W. S. P. M., W. by S, severe squalls, thunder and lightning.	....	....	....	On 19th a more moderate; ship having sprung a leak, was beached for the safety of all on board.

Victoria Steamer,	....	A. M. wind Southerly, strong gales. Noon 29.70 fresh breezes South. Noon 90 P. M. heavy squalls again from S. S.W.	A. M.	8 A. M. moderating. Noon fresh breezes. P. M. again squally, as also on 19th, when she anchored at Mangalore.
	9.30	More moderate. Wind S. by E., South and S. S. E.	....	Shifted her birth fur- ther in shore.
Atiet Rohoman at Alleppey,	76.24	....	....	On 19th, in Lat. 13° 28', Long. 73° 14', and steaming in for Cannanore.
H. C. Steamer Se- sotris,	13.52	Decreasing breeze. 8 A. M. N. N. W. and North to noon; P. M. squally; North to W. N. W.	....

The following are the views and data upon which I estimate the places of the centres of the storm for the different days, as I have placed them on the Chart.

The first Logs we have are those for the 13th April, on which day, or rather at midnight, between the 13th and 14th with the *East London* a gale is stated to have fairly commenced, which by 4 A. M. is called a *hurricane*, from N. W.,* which by noon of the 14th had veered to W. N. W.

Now, at noon of the 14th, this ship had the *Buckinghamshire* about 145 miles to the W. N. W. of her, with nothing more than a strong breeze from N. W. b. N., and the *Atiet Rohoman* at anchor at Alleppee, 140 miles to the North Eastward, with an E. S. E. breeze, and fine weather. If the *East London's* was at this time a rotatory storm, we must then infer it to have been one of small extent, since its centre would have been about N. E. from her, and have thus been at about half the distance between her and Alleppee, if only 140 miles in diameter; but it evidently did not reach that anchorage. If we call it then one of this class for this day, and suppose it the commencement of that of the following days, it did not exceed, if it reached to 100 miles in diameter; and indeed the only fair grounds we have for doing so are the regularity of fall of the *East London's* Barometer, and the gradual veering of the wind from N. W. to W. N. W. and W. S. W. on the 15th.

On these grounds, then, I have marked for this day, the 14th, a small dotted circle, (as being somewhat doubtful,) of 100 miles in diameter, and which leaves still a space of 45 miles to the anchorage of Alleppee, and of 110 miles to the position of the *Buckinghamshire*, which vessel had but a strong breeze and cloudy weather, and her Barometer yet as high as 29.72 at 1 P. M. Indeed, I am much inclined to take this N. W., W. N. W., and W. S. W. gale as nothing more than a strong precursor of an early monsoon, the tendency to North Westerly winds in March and April on this part of the coast being well known,† and

* This vessel was in much distress from leaks, and evidently was a bad sea boat, but she lost only a foretopmast, with small spars and sails, and repeatedly, (as far as can be inferred from her very incomplete log) hove to and bore up; which shows that the weather allowed her to remain quite manageable, and was by no means at hurricane force.

† Horsburgh, Vol. I. p. 524. The report from Mangalore to the Bombay Chamber

as will be seen, on the 15th it must have been a storm travelling ~~in~~ towards the coast from the W. S. W., and breaking up immediately, if it was one *on the 15th*.

To dispose then first of the *East London's* storm. We find that this vessel had run in 72 miles towards Cape Comorin, to the E. N. E., from noon 14th, to noon 15th, and that her N. W. *gale* of the 14th had veered to W. N. W., and at P. M. on the 15th it was W. S. W., "blowing furiously."

This would give the centre of a true rotatory storm as bearing N. N. W. from her; but if one, it must have been of much smaller dimensions than that of the 14th, since at this time, (though at 2 A. M. it had blown in heavy squalls from the S. S. E.) at Alleppey, it was then moderate, at S. E. with drizzling rain; and the *Buckinghamshire* 175 miles to the N. W. b. W. of the *East London*, had fresh gales at N. E., and at midnight her Barometer rather rising than falling; though this might have been the effect of her standing, though but slowly, to the N. W. I am then inclined to think that, if this storm of the *East London's* was rotatory, and not as before suggested the precursor of the monsoon, that it was of still smaller extent to-day, and just terminating; and that it was moreover so nearly stationary that it only made the short distance which I have marked for it, of 42 miles in the 24 hours, *and this to the E. N. E.*,* and all this is very conjectural, for a veering of 6 points in 36 hours, when approaching a high shore, and from the quarter from which the incoming monsoon is expected, is not conclusive evidence for its rotatory character; and the storm of the ketch *Ceylon Island*, which in Lat. 7° , when between Long. 79° and $77^{\circ} 30'$, and on the 16th and 17th, had a smart *Easterly* gale can form no part of this of the *East London's*, for it must have been to the Southward and Eastward of her on those days, when (on the 16th) the *East London* had the wind at S. W. off Cape Comorin, and moderating by

of Commerce, states that the first effects of the gale on the 16th, were from the S. W., and were supposed there to be an early setting in of the monsoon.

* This is quite against the usual track of our Indian storms, but such tracks do undoubtedly occur on the Western Coast of Australia, and I suspect of South America. See the "Sailor's Horn Book of Storms, for all parts of the world," just published. The proofs of hurricanes being often nearly stationary for a time, are numerous. See XI. Memoir in this Journal, Vol.—

noon of that day. The position of the ketch is moreover altogether too uncertain for us to consider her Log of any importance, except as showing that extensive atmospheric disturbances existed as far as the coasts of Ceylon before the commencement of the great hurricane ; and it seems to be, at least in the neighbourhood of coasts and in the Eastern hemisphere, a sort of rule that these violent hurricanes are preceded either by this sort of general disturbance, as at changes of the monsoon, or by long and oppressive calms.

For the *Buckinghamshire* on this day, 15th April, we find, as before mentioned, that she had fresh gales from the N. E. b. E. with severe squalls, and her Barometer still high—while the *Faize Rubany*, at 210 miles to the N. E. of her, close in with the shore, had it calm, with a confused swell only, which by 6 p. m. had changed to blowing strong from the S. E. b. S., with a high sea. By noon this day, therefore, we cannot allow that there are any fair grounds for assuming that the *Buckinghamshire's* storm had commenced with her, nor that the *East London* and *Buckinghamshire* had any parts of the same storm, for a circle of 100 miles only in diameter would have reached Alleppey from the position it must have occupied to give the *East London* a gale at W. b. S., and it would have required one of 340 miles to have reached the *Buckinghamshire*.

It is barely possible, that her N. E. b. E. gales, which had been splitting her (old ?) sails during the night, and the heavy S. E. sea which is noted at 9 p. m. on the 14th, were the effects of a circular storm, of which the centre must have been to the S. S. E. of her, but not at any great distance, for then it would have reached the *East London*. The foregoing would place the centre of the vortex for that day a little to the eastward of a line joining the head of the Maldives and Minicoy, and agrees with the report of the commander of the *Auckland* from the latter island, that the gale was not very severe there, which it would have been if fully formed on this day, for it must then have passed up very close to it.

On the 16th of April we may fairly assign a position to the centre of the storm, which was now undoubtedly formed, and at noon was with the *Buckinghamshire* a hard gale from N. E. b. N. with a high sea, veering to North, N. b. W., and W. N. W., and finally to about West at midnight ; while with the *Faize Rubany* it was a moderate gale

from the S. E. to the East. The other ships, *Mermaid*, *Victoria*, and *Atiet Rohoman*, from which we have logs on this day, were wholly out of the circle of the vortex.

For the place of the centre; it must also have been close to the *Buckinghamshire*, as the rapid veering of the wind from N. E. by N. to West at midnight, or 13 points in 12 hours, shows. Indeed, a projection of her track on a plane chart would make her to have run round the North-western, Western and Southern quadrants of the storm circle, at a distance of perhaps 30 or 40 miles, between noon and midnight, while it was rapidly passing up on a Northerly course ahead of her. Hence we cannot place it at a greater distance than 50 miles S. W. by S. from the *Buckinghamshire's* position at noon this day, or close to the Island of Minicoy.

It is very doubtful if the *Faize Rubany's* "moderate gale," though it would agree very well as to the direction of the wind, was any part of the storm on this day; for if we assume it to be so, we must first take it that the whole storm was of upwards of 480 miles in diameter, and then that it should have been blowing tolerably strong at Alleppey, where the *Atiet Rohoman* was lying with the wind at E. N. E., (instead of about S. S. E., which this position of the centre requires); and though with dark, cloudy, rainy weather, yet with so little wind that she crossed royal yards at 8 A. M., and did not send them down till the evening. This supposed storm circle would also reach the *East London* at its outer verge, but it would then require the wind to be S. $\frac{1}{2}$ W., and about the same strength as with the *Faize Rubany*; whereas it was with the *East London*, though moderating, still a smart gale from S. W. b. W. We may, it is true, presume that the two ships on the coast were sheltered by the mountains inland, but there was nothing to alter the direction of the wind with the *East London*, and five points is too great a discrepancy to allow of our considering this ship's storm as part of the *Buckinghamshire's*.

I am therefore inclined to take the storm of this day as having just formed, or just travelled up from the Southward, and having a diameter of 100 or 150 miles at most, and that the dark weather and heavy rain of the *Atiet Rohoman* were the joint effects of the verges of the *East London* and *Buckinghamshire's* storms; and we may finally remark that if the storm was then of 480 miles in diameter it would probably

have been much more violent near its centre. Hence I have given it only 150 miles of diameter for this day, differing herein from Capt. Carless, who in his remarks, while he agrees nearly with me as to position of the centre, thinks it may have extended to the *Faize Rubany's* position, but he had not seen the log of the *East London*, which doubtless would have altered his opinion.

For the 17th of April.—We have on this day the Logs of the *Buckinghamshire*, *Faize Rubany*, *Mermaid*, and *Victoria* steamer, to the right, or eastern side of the path of the storm, and the *Sesostris* on the left or North Western quadrant; and the winds and weather of these vessels agree fairly enough in placing the centre about 10 miles to the North, and on the meridian of Underoot Island. The diameter of the storm (that is the hurricane portion of it,) I should estimate to have been not more than 250 miles, which allows it to reach to the anchorage of Cannanore, where the *Victoria* was riding with a strong gale, which obliged her to slip and go to sea with the wind at E. S. E., veering to S. S. W. at 8 p. m. as the storm passed up; for at this time the breeze which the *Sesostris* had cannot be considered, as to strength, as forming any portion of a hurricane, though it was in the right direction, and in fact indicating a distant one by the swell.

On the 18th April we have the *Buckinghamshire* at noon in Lat 14° 10', Long. 72° 59' by Acct., and having been running up with the hurricane for the whole 24 hours! She was now so close upon its centre that at 2 p. m. when about 15 or 20 miles to the North West of this position, she had reached the calm at the centre, which would thus be in about Lat. 14° 22', Long. 72° 47' at that time or a little to the S. E. of it at noon. This position differs again from that given by Captain Carless, but I had the advantage of seeing Capt. McGregor in Calcutta, who handed me his private Log, and he stated that he thought the ship's run was over-estimated in the Log Book. Captain Carless further says that the *Buckinghamshire* while running to the Northward had a current of two miles an hour in her favour. I do not know, but suppose he assigns this as the rate of the storm wave and current? though he does not expressly say so; for Horsburgh says that there is but little or no current in March and April, except with N. W. winds, which give a little drain to the Southward. Our position it is true places the *Buckinghamshire* 102 miles from Vingorla, and that of Captain Carless' sketch chart at 35 miles only from

that port; but Captain Carless has omitted to note that the *Buckinghamshire* had $29\frac{1}{2}$ hours of drifting and sailing (a part of it in a hurricane too) before she anchored at 7.30 p. m. on the 20th off Vingorla. Perhaps her true position was at about 60 or 70 miles from that port, for 102 miles is a long distance for a disabled ship to make; but 35 miles would have indubitably drifted her on shore with the Westerly hurricane, gale, and breezes, she had (using these words to express the strength of the wind) from the time of her dismasting to daylight on the following day. If we take it that for the last 24 hours the storm wave was carrying her 3' per hour, this would about place her, in addition to her log, at 60 miles from the port; but we cannot assume this at pleasure; and if we place this ship 72 miles further north, we make the winds experienced by the others much more at variance than they are.* The *Mermaid* and *Faize Rubany* were both so close in with the coast that their winds, which should be about S. W. b. S. to S. S. W., are marked South with the latter vessel, and W. S. W. with the *Mermaid* just after noon; but these can be scarcely considered as the true direction, as the gale with them must have been influenced on the coast side by the high land; and to the westward the *Sesostris* had but a moderate gale from the northward, so that we may take fairly about 220 to 230 miles as the full diameter of the storm, and perhaps not above 180 as that of the true hurricane part of it, for the *Mermaid* and *Faize Rubany*, though in severe weather and much distress, had nothing approaching to a furious hurricane, and indeed the *Mermaid* must have foundered if she had had such weather.

On the 19th April, the weather appears to have moderated, and we have no farther authentic traces of this storm. Capt. Carless indeed alludes to bad weather in the Gulf of Cutch, experienced by the H. C. Surveying Schooner *Taptee*, and he states that on the 19th considerable magnetic disturbance was noted at Bombay, when the winds also varied considerably, but nothing like a gale was felt. The Barometer on the 17th and 18th was very little affected, and on the 19th, at 4 p. m. was lowest, with a strong breeze at N. E., so that we cannot assign any further track to our hurricane, which it is probable may now have been

* Why there is at one time a strong storm wave, and at another, in the same seas and seasons none, we cannot yet say, but I have no doubt there is this anomaly.

lifted up and (if the Cutch storms were any renewal of it) have again descended there,* as a moderate though still circular-blowing gale.

Rate of travelling.—Having thus settled the track of the storm, we have to investigate its rates of travelling. It will appear from the Chart that these are as follows :—

	<i>Track.</i>	<i>Distance.</i>	<i>Rate p. hour.</i>
		<i>Miles.</i>	<i>Miles.</i>
Noon 16th to Noon 17th April	N. 8° E.	180	7.5.
17th.....	18th..... N. 15° W.	220	9.2.

This last track does not agree with the shift experienced by the *Buckinghamshire*, which was from the E. S. E. to the W. N. W., and which would give a track of N. 22° E.; but first, ours is an *average* track for the 24 hours, and next the ship was drifting about for two hours in the calm centre,† so that we cannot say to which part of it she was carried. We must also take into account her being just dismasted, with both masts hanging to her side and beating under her bottom, which had to be cut away: and when life and death were hanging on the successful execution of this duty, it may fairly be doubted if the direction of the wind was correctly noted, or rightly recollectcd by any one?

The track given for the H. C. S. *Essex* is, it is true, laid down from her shifts of wind also; but this was an immediate shift or rapid veering without any calm interval, and it took place five hours after she was dismasted, and the wreck was cleared from the sides quickly after the accident; she had besides the complement of six officers, which the Company's China ships in those days carried, and thus there can be little doubt that her winds are correctly given where marked, and that the track of her hurricane is to the N. N. W.

The rates of travelling of the *Cleopatra's* hurricane are quite within the limits at which our Indian hurricanes have been shown to progress, and do not call for any particular remark.

* In my new work I have, I think, shown satisfactorily, that hurricane storms are mere disks of from 3 to 10 miles in height, and that it is much more than probable that they are formed above and descend; and we have instances on land, though not at sea, of their rising up and re-descending.

† Taking the calm to have lasted two hours and the hurricane to be moving on, as we have seen, at the rate of 9.2 miles per hour this gives about 18½ miles for the diameter of the central calm space.

The early epoch at which this storm occurred is worth noticing for future guidance. Horsburgh, p. 523, Vol. I. note, notices "a heavy storm from the Southward, on the 20th and 21st of April, 1782, on most parts of the coast, in which H. M. S. *Cuddalore*, the *Revenge*, and several other ships foundered with their crews, and others were dismasted," and he says that "since that time no others have occurred so early in the season, but at the latter end of April and early in May some have suffered by S. W. and Southerly gales," which may have been the setting in of the monsoon. He mentions also, p. 529, a S. E. gale at Bombay, in November, 1799, veering to the Eastward, and blowing a hurricane for some time, in which ships were wrecked in the harbour. If this was a true circular storm, it would have a track coming in from the W. N. W., and advertiring to my remarks in the note at page 45, on the possible track of the *East London's* gale, it is not, I think, wholly impossible that this may have occurred.

Remarks on the lesson afforded by these hurricanes.

"It is singular that we have here again, as in the case of the loss of the *Golconda* troop-ship, in the China sea, (Fourth Memoir, Jour. As. Soc. Vol. IX.) three lessons of the highest importance from a single storm! We have the *Sesostris* steaming back out of the bad weather, between the 17th and 18th. The *Essex* in 1811, and the *Buckinghamshire* in 1847, running headlong into the centre, and in imminent peril of foundering; and finally, the *Cleopatra*, which vessel there is every reason to believe, (see Part II.) must have committed the same error, and has been destroyed.

If warnings like these are not listened to, it is difficult to say what will be required. Nothing short of the destruction of a whole fleet would seem sufficient to rouse the attention of those whom it behoves to insist upon the laws of our science being as duly attended to as the lead and the chart, and upon every Commander intrusted with public property noting in his log his reasons for standing on or heaving to on the approach of bad weather; and this will, in case of his return to port in a disabled state, at once show if he understood his position or not. If he did not, he is unfit for the command of a vessel till he does.

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PART II.

*Considerations on the Loss of the Cleopatra Steamer, and for Steamers
in the Eastern Seas in general.*

The object of the whole series of these memoirs being not only the investigation of the scientific questions which they elucidate, but also the preservation of life and property as promoted by the research, I make no apology if in this section I go into some few technical details which in truth are as scientific, though not so little known or understood, as the wonderful and mysterious phenomena which a hurricane always presents. We fulfil but half a duty if we neglect to enforce on such occasions as these the plain common sense lessons (homely though they be thought) which arise out of the facts before us.

For European readers it may be necessary to state that the *Cleopatra* was one of the E. I. Company's War Steamers, of about 800 tons; her power is not given in the replies to my queries. She would however, it is stated, go 9.6 and 10 knots with a good *fair* 7 knot breeze for a merchantman, and 5 knots *against* such a breeze, and from 3 to 4 and 6 knots according to the sea when close hauled with trysails, in a close reefed topsail gale for a merchantman. She is said to have been 8 years old, and to have been docked in December 1845, well furnished with pumps and some worked by the engine as usual. She was considered a good sea boat, and it is only stated as "*very probable* that her Commander had any of the new works on storms on board."*

The *Cleopatra* left Bombay with convicts for the Straits settlements, having altogether about 250 souls on board, on the 14th April, 1847, at 1.55 p. m., the time given for her having cleared the harbour. She

* It will be understood that these statements are all from the replies to my queries. From this last phrase, it is clear that she was sent to sea without any thing positive being known on the subject! and it is to me quite probable that she had not; for since 1889, that the science has been in every way, both at home and in India, urged on the attention of nautical men (the very newspapers in India, and the *Bombay Times* amongst others constantly recurring to it) we have till 25th Aug. 1847, the date of Captain Carless' remarks, from a service numbering I believe 150 or 200 officers and midshipmen, not a single word or line of report or remark published or forwarded anywhere, and moreover every application for information utterly disregarded! This is grievous truth for English sailors to read, but it had better be told than hidden or slurred over, because human life must very often, and even the honour of our flag, *may sometimes*, depend upon the progress we make in this, as in all other branches of nautical Meteorology.

was, it is said, not deeper *than usual*, nor leaky. I do not know, but presume that she would have touched at Point de Galle for coal; but nevertheless we may fairly suppose that her coal and provisions brought her as low as possible.

Capt. Carless, who knew the vessel and had every opportunity of information on the spot as to probable winds and weather, and the route she would have followed, thinks she would have passed down midway between the Easternmost Laccadive Islands and the coast. He supposes her average speed up to noon of the 16th "could not have exceeded 7 knots." This would place her then in about Lat. 13°. And he then considers that "she may have made to the next day 4½ knots." This would place her at midnight, between the 16th and 17th, 54 miles to the S. S. E. of this position, or more probably due South of it, as she must have made much leeway from noon, and as I shall now show, was probably before midnight unmanageable, and at that time involved in the centre. I have therefore chosen the conjectural track laid down for her at this time. We can only in cases like this conjecture the unknown from the known, and before I proceed, I am desirous of adverting to two well known instances of Steamers running headlong into hurricanes, and by the avowal of the commanders, escaping only by a sheer miracle, and we put aside, for the sake of argument, the remote probability of the *Cleopatra's* having been destroyed by fire, or lost through a mutiny on board, because there would be in such cases so many chances of one boat at least escaping.

The first of these instances is that of the *Great Western* Steamer, in October 1846, which vessel indubitably steamed into the Southern side of a hurricane, and apparently into or close to the centre. Though I have only a newspaper account of her distress, yet it seems evident that this fine vessel, though built to cross the Atlantic, was *next to unmanageable*, and nearly swamped when in the central portion of the hurricane! In the same storm a Royal Mail Steamer slacked her speed on the approach of the hurricane and at the proper time bore up and ran round the heel of the storm with a fair wind!

The next instance is one in our own seas, and very closely resembles the *Cleopatra's* probable case. It is that of the H. C.'s War Steamer *Pluto*, which vessel left Hong Kong on the 27th June, 1846, bound to Borneo, to join H. M. squadron under Rear Admiral Sir Thos.,

Cochrane. The *Pluto* steered down on a S. b. Westerly course, and in the face of every indication, ran headlong, about noon on the 29th, into the centre of a terrific Tyfoon, coming up, like that of the *Cleopatra's*, from the S. S. E., in which she lost her masts, rudder, funnel, &c. &c., and drifting back was nearly wrecked on the rocks of Hong Kong. And she also was, as may be supposed, nearly or totally unmanageable in the tyfoon from the excessive violence of the wind, and her engines being utterly powerless contend with the sea.

Now, from analogy* we should judge that the *Cleopatra* was probably no great sea boat in a hurricane, whatever she might be in a common gale,† and that the *Pluto's* history was pretty nearly hers, namely that on nearing the centre she became unmanageable, and lying in the trough of the sea, went over and was swamped, and probably lost her funnel before this took place, which accident alone, if it occurred, would give rise to the other contingencies.

And this last accident, the loss of the funnel, I allude to very pointedly, because I think it one very likely to happen. My query on this head to the Bombay authorities is as follows :—

“ 10. *How was her funnel secured, i. e. how many shrouds and stays, and of what material and size were they? as nearly as can be stated.*”

The reply is, “ *Properly*,” and I forbear to remark on its brevity; but I assume it as my sailor readers, and landsmen also, will I think construe it to mean “ Properly for an ordinary gale: can't say as to a hurricane?” for this query might indubitably have been answered in full detail from the dockyard and work shops, and within a trifle as to correctness.

* I do not allude here to the loss of the *President*, though she also was steaming into a hurricane circle when last seen.

† The reply to my query on this head alludes of course to common gales, but even of these, how unfair to the eye of a seaman, is the estimate which is formed of Steamers in this respect under all the usual circumstances. Their engines keep them to the wind and sea at the very best angle for meeting it, and the steamer is called a good sea boat. When the engine gives way, or has no longer sufficient power, or the fires are swamped, we find the greater part of the steamers forthwith in distress, often when a smart merchantman would be “ taking it easy” under her storm staysails, or close-reefed maintopsail. By the log of the *Semiramis*, a sister-boat I believe to the *Cleopatra*, in this very hurricane, though she had but a capful of wind, with a high confused sea, yet she had all hands (troops on board) pumping and baling! We must then take the words “ a good sea boat,” with the addition of “ while her engines can help her,” for most of our sea-going steamers as yet.

And it is impossible, I think, for any seaman who knows what an Indian typhoon or hurricane is, to look to the cobweb rigging of any of the sea-going steamers, and the entire absence of all pendants, or eye-bolts to which a preventive shroud or tackle can be attached, and to believe that, when laid down with their lee gunwales in the water, and in a hurricane, in which, to quote the words of Capt. Doutty of the Rumphimed, an experienced old West India commander (Journal, Vol. XIV. p. 365,) *the severity of the wind is beyond description, there is nothing to compare it to, for unless present, no one can conceive the destructive power and weight of wind, crushing every thing before it as if it were a metallic body,* these iron towers can stand half an hour ?*

I do not forget that a steamer has not the heavy masts and yards of a sailing vessel to lay her over in a hurricane, but on the other hand, her light spars would at most be equivalent to jury-masts in the wind and sea of a typhoon ; and she would labour as heavily as a ship without masts for the want of top weight to steady her. This difference is well known and calculated upon by ship-sailors, who, while it will stand, I fancy always prefer a close-reefed maintopsail to lie to under, "to keep her steady ?"

And there is a farther danger, which evidently has never been thought of, which is that at the very height of these terrific tempests the funnel must stand as it can, by its own strength, for it has no support from the rigging, till it has laid far enough over to wrench itself out of the deck ! This will startle many, but is easily shown. In harbour the iron shrouds are all slack, to allow of the expansion and lengthening of the funnel by the heat. In practice also the funnel, I am informed, is fitted slightly loose in its socketting to allow of the lateral expansion : Now if it contracts while the vessel is laid down in a hurricane the whole weight of it must hang on the shrouds or depend on the strength of the materials.

Now when the spray and "rain as cold as ice,"† is beating upon it, the temperature must be much lowered, but if the fires are put out by the sheer impossibility of keeping them in, or by the water in the engine room ; it is clear that the funnel then must contract a little and the

* There is no exaggeration in this. It has occurred again and again in our typhoons and hurricanes. The late Mr. Greenlaw, in the letter alluded to at page 36, says of the hurricane of the H. C. S. *Essex*, that he felt that if he had fallen down he should have remained as if nailed to the deck when the ship rolled to windward !

† Capt. Rundle's Log, Journal A. S. Vol. XIV. p. 33.

shrouds become slack exactly when most wanted to be taut. I have little doubt that this was one reason of the loss of the *Pluto's* funnel.

I do not advert here to the large openings necessarily left in Steamers, farther than to say that unless much more strongly covered in than a common hatchway, their being stove in by a sea is not an unlikely but even a probable accident, serious as it would be. And this seems to have attracted attention at home, for in a recent notice of the improvements in H. M. Steam Ship *Fury*, of 1123 tons, and 550 horse power, I find it stated that "she is fitted with circular hatches over her engine-room, which in warm climates throw open its whole area to the currents of air from the deck;" and it is added that "This plan also affords the most perfect security in a gale of wind, preventing the shipment of seas in the engine-room."

If this was thought necessary in a first rate steamer for the storms of the Channel, the Atlantic, and the hurricanes of the West Indies, and doubtless sanctioned by the Admiralty because much *insecurity* had been found in heavy weather on the old plans, we may fairly doubt if, for our seas, where, we may say without exaggeration of some of our hurricanes and tyoons, that nothing made of wood or iron or rope can hold against them; we have got much yet to learn in the art of properly securing our steamers' funnels and hatches, so as to avoid the dismal repetition of the *Cleopatra's* loss—with a freight other than of convicts.

And the remedy for this is so simple that I think (after another catastrophe or two) it will not fail to be adopted; i. e. to have a stout hoop with strong eyebolts and chain pendants, the whole of workmanship and stoutness sufficient to bear the whole weight of the funnel when the vessel is upon her beam ends, fitted to the head of the funnels. Stout runners and tackles, like the lower tackles of ship's fore-masts, should be kept ready rove, and upon the approach of severe weather these should be carefully set up.

There is nothing in this but the precaution which every good officer takes with his lower masts, in tackles, preventer shrouds, &c. in a sailing vessel; and the loss of a funnel or of both of them, is an accident of too grave a kind to be thought lightly of, because it may seldom happen. My belief is that under the present system it may probably *always* happen in every Steamer that becomes unmanageable in a tyfoon.

Extract from a Memoir of some of the Natural Productions of the Angami Naga Hills, and other parts of Upper Assam, by J. W. MASTERS, Esq. (Communicated by G. A. BUSHBY, Esq., Secretary to the Government of India.)

GEOLOGICAL SPECIMENS.

I saw very little that appeared to me interesting in Geology on the Angami Hills; scarcely any thing but sandstone, of different degrees of compactness, from soft and friable, to hard.

The following specimens will show the nature of the rocks met with on the route.

1. This is a fragment of one of the sandstone pillars in the old fort of Dhimapura. For a description of the pillars, see Captain Butler's Journal.

2. Fragment of a sandstone rock from the N. E. side of Samujading. A great portion of the hill is composed of this description of rock.

3. Fragment of a more compact stone found on the top of Samujading. Many large blocks of this description are lying loose on the summit of the hill.

4. Fragment of a tombstone from Samujading. The four show the different kinds of rock that are to be met with at Samujading and along the banks of the Dibbu. No rocks or stones are found in the bed of the Dhangseri, between Gologhát and Dhimapura, except such as flow out of Dibbu Mookh.

5. Fragment of foliated clay slate, of which the hill of Prephinia is composed. This specimen was procured from a ravine below the village, where the strata are nearly perpendicular. The rock differs in compactness at different points; when exposed to the action of the air, it crumbles down with the least touch; at other points where protected, it is more compact like the specimen, and large flags may be procured.

6. Fragment of one of the rocks common at Mazamuh. Of this description of rock the terrace walls are formed in the ricefields. These are the only kinds I observed on the Angami hills. I saw no Iron, Salt, Coal or Lime.

COAL.

The following specimens of Coal were collected from the different localities mentioned below :

7. Coal from the Jamuná falls, highly impregnated with sulphuret of iron, and liable to spontaneous combustion. The spot from which this specimen was procured is about half a mile above the falls, and five yards from the Jamuná river. The seam is eighteen inches thick. The sample alluded to in the Coal Committee's report for 1845- section 39, and said to be "one of the purest and finest Coals hitherto met with anywhere," was a detached piece of Coal picked up by Mr. B. Wood, among the rocks at the falls; from whence it came has not yet been ascertained.

8. Coal from the Diphu Nadi, 8 miles above the falls of the Jamuná. The seam is 2 feet 5 inches thick.

9. Coal picked up in the bed of the Sundrá in the Lakhapura district. Small bits of coal are found scattered over the bed of the river from the mouth of the Jeching to beyond the first range of Duphla hills. No trace of any seam or accumulation in any part of the river visited.

10. Coral formation from the bed of the Sundrá.

11. Coal from Jayapura. Jayapura is the only known coal locality to which boats can have free access without risk or obstruction. In the Desairy there are stiff rapids to be encountered below the coal of Borhát. In the Suffry the rapids are more numerous and the navigation more difficult than in the Desairy. In the Dikho there are upwards of 20 small rapids, between the Santuk Mukha and the coal.

LIME.

12. Fragment of a large block of shell Limestone from the falls of the Nambin; very plentiful.

13. Fragment of a large block of compact Limestone from the falls of the Nombar.

14. Fragment of a Limestone boulder from the bed of the Hurrio Ján.

15. Limestone boulders from Sunapura. These are found thinly scattered over the numerous quartz and granite boulders in the bed of the Brahmaputra above Noa Dihing Mukha. They appear to be

brought down by the Digaro, as they are more numerous near the mouth of that river.

16. Limestone boulders from a little below the Khúnd. As we ascend the river, the boulders become larger, some of them consisting of pure white Marble.

IRON.

17. Clay from Golághát, containing granular Iron Ore.

18. Sulphuret of Iron from the Jamuná falls.

MISCELLANÆ.

19. Pipe Clay from the Námbar falls.
20. Pipe Clay from the Jamuná falls.
21. Fragment of a rock near the hot spring. *Burra Noong poong.*
22. Fragment of a rock at the Námbar falls.
23. Fragment of a rock forming a rapid in the Hurrio Ján.
24. Fragment of a rock on the Tokapháng Naga hills.
25. Fragment of a rock at the Jamuná falls.
26. Fragment of a rock on the Mikir Hills.
27. Fragment of a rock on the Mikir Hills, Jamuná falls.
28. Sandstone from the first hill banks of the Sundrá river. Cliff nearly perpendicular.
29. Sandstone from a high cliff about 3 miles above No. 28.
30. Conglomerate forming faults ? in the high cliffs of Nos 28 and 29.
31. Fragments of Granite boulders from the bed of the Sundrá.
32. Fragment of the rock at the Brahma Kunda.

Examination and Analysis of the BALL COAL of the Burdwan Mines, by HENRY PIDDINGTON, Curator Museum Economic Geology.

The Museum is indebted for this specimen to D. Williams, Esq. the Government Geologist, who informs me that these singular balls are very common in the Burdwan mines, though I am not aware that they have ever been noticed before. He says they are of all sizes, from that of a Cannon ball, to a man's head, and even 18 inches in diameter.

Like the Burdwan, and many English kinds of coal, these balls are composed of alternate layers of a bright bituminous and a dull jetty kind of coal, splitting easily between the layers. Our specimen was

found very tough and difficult to cut with a saw. There was no difference between the centre and the periphery of the ball, nor any thing that could give the idea of a nucleus or of concentric layers.

And upon considering it attentively it will be seen at once that it is nothing more than an oblique rhomboidal prism of the common coal of the mines, rounded *somewhat* into a rough ball. So far, for the present as to its external characters.

I find its specific gravity to be 1.37. The mean of 5 specimens* of Burdwan Coal is 1.365. I place here its analysis and the mean of the first six specimens referred to in the note below.

Analysis of the Ball Coal. Mean of Burdwan Coal.

Mr. Prinsep's Table.

Water,	5.00	7.4. .
Volatile matter,.....	29.00.	35.6.
Carbon,	57.00.	52.5.
Ash,	9.00.	12.2.
	100.00.	

There was a slight excess in my analysis; no doubt due to the peroxidation of the Iron.

I had not, from Mr. Williams, any note of the particular mine from whence our ball was taken, so as to compare its analysis with that particular coal, but from its agreeing so nearly, we can have little doubt of its having the same origin as the average of Burdwan Coals. But then comes the curious question of "*How did it become rounded and deposited in the coal bed after it was a rhomboid of coal?*" for the total absence of any concentric layers or other trace or indication of organisation, leaves no doubt about its having been one. It is in fact such a rounded boulder of somewhat tough coal as we should expect to meet with in a stream of moderate velocity—with its layers parallel to the base of the prism.

I fear this must remain, like so many other geological questions, matter of conjecture; for the imagination is almost startled at the idea of the time required for coal to be formed, and then broken up and carried off in boulders to be deposited again in new beds forming at a distance: as we might suppose the Mississippi to be now rolling lumps of coal with its huge rafts of timber and mighty masses of vegetable matter,

* From the first six in Mr. Prinsep's Table; Journal, Vol. VII. p. 197.

to deposit them amongst beds of coal forming (if any are so,) in the Gulf of Mexico ! Yet to this conclusion we come ; nor is it easy to imagine any process by which these balls could have been formed but that of rolling. If they were homogeneous throughout we might suppose them imperfect crystals ; if with concentric layers, or a nucleus, that they were derived from some particular vegetable production ; and finally, if coal was a rock exposed to the air, that, like granite, the crystal or mass had been weathered, and not *worn* down at the corners. It evidently *is worn* ; and correct information as to how these balls are found *in situ* with every particular regarding them, would be highly acceptable. I do not here advert to the theory of coal being a purely mineral deposit, as it has been found in so many points untenable against that of its having a vegetable origin, at least so far as relates to bituminous coal.

H. P.

P. S. Since this paper was written I have obtained a copy of Mr. Homfray's second pamphlet on the coal field of the Dummooda, and Adjî, in which that gentleman, an able and experienced miner, who gives one of the localities has noticed these balls (p. 26) in the following terms :—

" We proceed westward and come to China Coory, where only $7\frac{1}{2}$ feet of the vein is worked as good ; further west we cross the Barracar river, and the Coals in almost every locality are of a much better quality than those from the eastern division ; those near to Pachete Hill are good and very bright. We come then to the Coodeah nullah, running into the Barracar river, and there the coals are very superior, and it is from some of those little localities about there that the vein produces Coal, which as I before said, yields a fair third rate coke ; the vein is thicker and the Coal much brighter, but more tender, and contains a vast quantity of round balls of Coal, as though large lumps had been submitted to the attrition of a running stream ; this is found when the vein of Coal exhibits no symptoms of derangement save these nodular balls, which are generally the size and shape of a Dutch Cheese. Without doubt the Coal at this part of the country is the best for all purposes."

It is evident that Mr. Homfray, considers them as I do, as blocks of coal rounded by water. How could this happen, and their subsequent deposition in another Coal bed, without their having belonged to a Geological era preceding all the present supposed ones !

*The Land Shells of the Tenasserim Provinces, by Rev. F. MASON,
A. M., Corresponding Member of the Boston Society of Natural
History, U. S.**

Being requested, a few years ago, by a distinguished American Conchologist, to send him some land and fresh water shells, I subsequently collected every species I could find in the Provinces, and transmitted specimens of each to America, where they were examined by my correspondent, and nearly *forty* species pronounced new. Most of them may be found characterised, or described, in the Proceedings or Journal of the Boston Society of Natural History.

Dr. Gould wrote me that he had furnished his correspondents in London and Paris with specimens of all the new shells I had sent him; but on a recent visit to the Museum of the Asiatic Society, I could not find a single specimen of our Tenasserim land shells. It has therefore occurred to me that a Catalogue of all the land shells I have noticed in the Tenasserim Provinces, with a few brief notices of each, might not be unacceptable to the readers of the Journal; and whenever I fall in with my collections again, I shall endeavour to furnish the Museum with specimens of each species.

The Genus *Helix* is the most abundant in species; there being *nine* at least, and all new.

H. procumbens, Gould, is a flat discoidal shell, with four whorls, the outer one deflected. "Diameter $\frac{3}{4}$ of an inch; height $\frac{1}{4}$ of an inch. Belongs to the group of which *H. planulata* is the type."*

H. infrendens, Gould, is a small orbicular shell with three oblique teeth. "Diameter $\frac{2}{5}$ of an inch; height $\frac{1}{5}$ of an inch. Very closely allied to *H. rangiana*, Fer."

H. anceps,† Gould, is a fragile shell with six whorls. "Diameter $\frac{7}{16}$ of an inch; height less than $\frac{1}{2}$ of an inch. In general form, color, and sculpture, it resembles *H. acies*, Fer. (*acutimargo*, Rosm.) but is much smaller, and not widely umbilicated."

H. honesta,‡ Gould, is a small thin shell with five whorls. "Dia-

* As Mr. Mason has been good enough to furnish us with specimens of some of the shells enumerated in the present paper, we are enabled to identify several of these with species already described by Benson and others.—Eds.

† *H. serrula*, Benson.—Eds.

‡ *Nanina vesicula*, Benson.—Eds.

meter $\frac{9}{10}$ of an inch ; height $\frac{1}{4}$ of an inch. Resembles *H. fusca* more than any other species I have seen. It is probably a *Nanina*."

The above four species are remarkable for being found on the branches of the Peepul, and other species of the Genus *Ficus*. This is so characteristic of these snails, that the Karens call them Kló-khleu, *Ficus shells*.

H. saturnia, Gould, has five whorls, and is the largest species of the genus that we have on the coast. "Diameter 2 inches ; height $\frac{1}{4}$ inch. In size and form it is like *H. lampas* from Jamaica ; but differs especially in having a broad, deep umbilicus."

H. refuga, Gould, is a sinistral shell with a depressed spire, six whorls, and deflected aperture. The Karens do not distinguish it from the *Planorbis*. "Diameter $\frac{3}{5}$ of an inch ; height $\frac{1}{5}$ of an inch. This remarkable shell is almost exactly like *H. carabinata*, Fer., except that it is reversed, and has no lamellæ revolving within the outer lip."

H. Caracolla zabata, (Gould.) has a carinated periphery and very deep umbilicus. It is most abundant during harvest, and hence the Karens call it Kló-bú, *the paddy shell*. "Diameter $\frac{4}{5}$ of an inch ; height less than $\frac{2}{5}$ of an inch. Much like *H. scabriuseula* in form and aperture, but quite different as to surface, color, and umbilicus."

H. Caracolla retorsa,* Gould, is a large sinister shell ; called by the Karens Kló-búphan, *the paddy blossom shell*, because most abundant when the paddy comes into flower. "Diameter $1\frac{3}{4}$ inches ; height 1 inch. This large heterostrophe *Helix* resembles an inverted specimen of one of that group of shells, so common and so varied, from the Philippine Islands, of which *H. lamarckii* is one. Young specimens might, at first glance, be confounded with *H. himalana*, Lea ; but the *himalana* is much more globular, the surface less striated, the carina quite indistinct, and the umbilicus smaller."

**H. (Streptaxis) petiti*, Gould, is a distorted little shell, with a spire of seven whorls. The Karens call it Kló-beú, and Kló-phong, *the coix shell*, from its resemblance to the seed of a species of *coix* with which they adorn their garments as a substitute for beads. "Length $\frac{3}{8}$ of an inch ; breadth less than $\frac{3}{10}$ of an inch. In size and exterior, it closely resembles *S. aberrata*, (sou-leget,) but is rather larger."

The genus *Cyclostoma* has three representatives in our Tenasserim jungles.

C. tuba, Sowerby, is more common, perhaps, than any other species.

C. pernobilis,* Gould, is also very abundant. It is the largest land shell in the country, and the largest species of its genus.

The Karen call it Kló-mú-pghà, *the primary shell*, i. e. the one from which others are derived. The Burmans call it Khó-rú-quet, the *Quet shell*; as they say it calls out *Quet, quet!* Nearly all the different species of *Helix* above are called by the Burmans varieties of the *Quet shell*. "Diameter 2 inches; height 1 inch. This superb species is a little larger than any one hitherto described. The *C. involvulus*, Sowerby, is a miniature of it."

C. sectilabrum, Gould, has an elevated spire with eight whorls. "Length 1 inch; breadth $\frac{1}{4}$ of an inch. Closely resembles *C. altum*, Sowerby, but has the fissure across the peritreme on the opposite side. *C. croceum*, Sowerby, may be only a faded specimen of this shell."

We have three species of *Bulimus*. One, a small red species, Dr. Gould thought to be new, but hesitated, and he has not therefore described it.

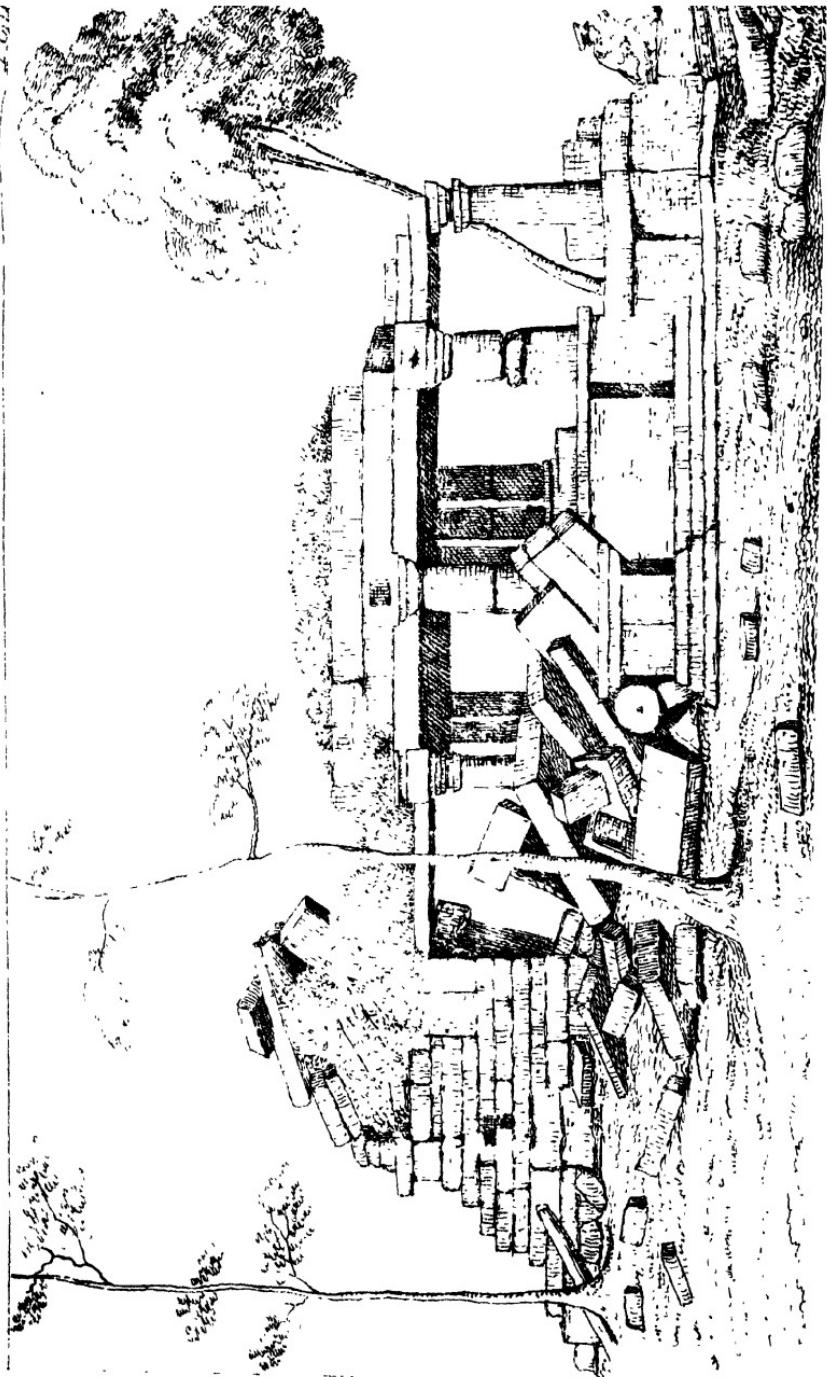
B. atricalllosus,† Gould, is a large and elegant sulphur-coloured species with seven whorls. It is a great favorite with Karen females and is often seen strung, with the other species of the genus, on their necklaces. They call it Kló-bau, Kló-bang, *the yellow shell*. The Burmans call it Bying-khzá, *heron's dung*. "Length $1\frac{1}{3}$ inches; breadth 1 inch. It is of the same type as some of the shells from the Philippine Islands, as *B. vittatus*, *dryas*, and *maculiferus*."

B. moniliferus, Gould, is a variegated shell with seven whorls, for the most part sinistral, but I occasionally meet with dextral shells. "Length $1\frac{1}{3}$; breadth $\frac{7}{16}$. Differs from *B. contrarius* and *B. kerius*, Müll., by its angular aperture, and the colour of its lip and throat."

I have met with one species of *Clansilia*, the largest species of the genus known. Dr. Gould named it *C. insignis*, but subsequently wrote *C. insignis* is *C. cochinchinensis*, Philippi, published about the time I received your specimens."

* *C. involvulus*, Benson.—Eds.

† *B. citrinus*, Lam. var. E., Swainson.—Eds.



On the flowering shrubs in my garden in Tavoy, I occasionally found a species of *Succinea*, which Dr. Gould has named *S. semiserica*. "Length $\frac{1}{2}$ inch; breadth $\frac{3}{16}$ inch; height $\frac{3}{16}$ inch. Its shape is like *S. tigrina*, Fer., and it is well characterised by the silky-white or pearly surface of the anterior half of the shell."

The genus *Vitrina* is represented by *V. præstans*, (Gould;) a very delicate shell and the largest species of its genus. "Greatest length $\frac{4}{5}$ of an inch; height $\frac{2}{5}$ of an inch. The colour is dark straw-colour, or amber-colour, inclining to green."

Under every pile of fallen leaves, under every brick that has laid a few weeks on the grass, and every fallen timber, may be found in Tavoy a small, sulphur-coloured species of *Achatina* with eight whorls; *A. octona*.

In the same localities, and in company with the above may be occasionally seen a small red species of *Pupa*; *P. mellita*, Gould. "Length $\frac{9}{16}$; breadth $\frac{3}{16}$. The general aspect of the shell is not unlike that of *Achatina octona*.

On the Antiquities of Sargujá and its neighbourhood; by Lieut.-Col.

J. R. OUSELEY.

To the Secretaries of the Asiatic Society.

MY DEAR SIRS,—On the 19th of last month I despatched to the address of Mr. Piddington, for the Society, a complete Lingam and Jhiléri or Argah, from the deserted fortress of Jooba, in the Pál Per-gunah of Sargujá. The people of the country cannot account in any way as to the era in which it was made, or when even Jubá itself was deserted, nor can the Rája of the country, Mahárájá Amar Sinha Deva Bahádar. He surmises the period to be long prior to the Ballan Dynasty. The Ballans were expelled by his ancestors, many generations ago.

Mánpura, the chief town of the Pál Parganah, is about 2 or 3 miles North West of Jubá; the latter is situated in a gorge of the

hills, on the shoulder of one is the Fort, and below, among the tree jungul, are the remains of carved stone temples and stone walls, now lying about in fragmants, or nearly covered by the accumulations of burnt and rotten leaves ; among them was this Lingam, which having a well carved face and head projecting from the surface (of the Lingam) I thought it desirable to send it to you—with its Argah or Jhiléri.*

At Maháoli, a place 8½ miles North West of Mánpura, I observed a long cut stone* lying on the ground in a field and had it turned over. I was glad to find that there was an inscription on it of the year 1296 Samvat, with several figures, in relief ; Captain Kittoe took off impressions of the inscription, after I brought it to Chotá Nágpura. I think it appears to be a sati stone. Captain Kittoe considers it to be a record of a victory. I conclude that some of the Pandits at Calcutta will be able to make out the purport of the Legend. Pal is the Northern Parganah of Surgujá, and the borders not above 70 or 80 miles from the town of Mirzápura.

Within 9 miles South West of Lakhnapura (west of the tablelands of the Moynpat) is the celebrated Rámgarh temple, situated on a hill of that name. I send a rough sketch (Pl. III.) of the remains of the temple on the top of the hill, which is about 3,100 feet in height. The antiquity of the temple must be very great. Captain Fell, Professor of Sanscrit, endeavoured to reach these temples, but failed, being attacked with fever and dying on the road. The temple having partially fallen, I could discover no heejuk. In the centre of this sandstone hill is a fine coal-bed, over which flows a spring, called the "Thoora Panee;" it is on the right of the road ascending (about half way up); proceeding along the Eastern skirt of the hill—near the Northern extremity, is a very singular tunnel of about 25 feet in width by 15 or 20 high, which runs for 140 or 150 yards horizontally through the hill whether artificial or natural, I cannot determine, opening into a beautiful basin, which would have been a lake but for the tunnel through which a small stream runs. Turning to the left, on passing the tunnel, you come to the face of the Rámgarh Hill, and in this face are excavated some wonderful caves, with small stone figures in them; wild animals now take up their abode in the caves ; the impressions of a tiger's feet were

* An account of these will be given hereafter.—EDS.

freshly made in the sand of the stream, in the tunnel. Within 4 or 5 miles East of the Rámgarh hill, is another Mánpura, a small village. The Kéhar river runs from South to North, within a mile and a half of it; on the banks is a temple, the main body of which is built of brick, and the porch, &c. in front, of stone, facing the East, has entirely fallen, but only part of the brick temple itself, which is built of the most beautiful brick. I sent one of the bricks to the Society. I have thought it desirable to send a rough sketch I made of this brick temple, which is supposed to be several thousand years old. There are in a direct line North of this temple, no less than 10 or 12 others, all lying in ruins, built of sandstone; time having much defaced the very beautiful carving. In no other temple could I detect brick, and no appearance of mortar having been used in any. These temples deserve particular examination and more time, than I could devote to them. They are Brahminical, I have no doubt, from the figures of Ganésa, &c. There are many tanks now nearly filled, and others in good order, in every direction round the temples.

At Dipádi, a place 80 or 90 miles East of this, near Chulgulli, are a great many temples precisely like these, of sandstone, and carved in the same manner, but overthrown as by an earthquake, and many all but covered over by dust-storms, &c.

A hot spring exists at Tata-páni (hot water); in Sargujá the heat of the water is 184° Fahr. and the smell very disagreeable; an old temple is to be seen here in ruins; the country appears to be volcanic. I formerly had the pleasure of sending several bottles of the water, carefully filled on the spot by Captain Hannington, Deputy Commissioner, to Mr. Piddington, with some remarks on the place, but I have heard nothing further on the subject as regards the analysis.

This country (Sargujá) is well worthy the attention of the Geologist; its coal, iron, gold, ochre, marble, lime, &c. are most valuable. The height of the inhabited parts above the sea from 1,500 to 3,600 feet. The climate cool, agreeable, and healthy; the scenery beautiful. Rivers in every direction, woods and hills, on which are extensive table-lands at about 3,300 feet in height. For the sportsman, few places in India can excel this. The Gour abound, Deer of all sorts, wild Buffaloes, Elephants, Tigers; in fact all, but the Rhinoceros, of the animals of India.

The period is not distant when I hope to see European colonization attempted. The table-land of the Maynepat, extending for 50 miles East and West, by 30 miles wide, at an altitude of 3,300 to 3,700 feet, is admirably adapted for the speculations of Europeans, the native population is thin, there only existing 16 inhabited villages in the whole Maynepat table-land, and not above 250 inhabitants (men, women and children). It is too cold for the people of the plains, about 1,200 or 1,400 feet below. In these hills are a race of people who are stated to devour their own parents when too old to work, the "Kowrahs." They do it as a religious duty, I am informed; are almost naked, and are seldom or ever seen.

I remain,

My dear Sirs,

Your's very faithfully,

J. R. OUSELEY.

Chota Nagpore, Nov. 6, 1847.

I forgot to mention, that the name of the brick temple, is "The Charkhá Déwal," and of the Tunnel, the "Hath Phore"—and that of the chief cave temple in which are four stone figures, "The Sitá-mari."

Inscription from the Vijaya Mandir, Udayapúr, &c.

We sometime ago received from Capt. J. D. Cunningham a large packet of inscriptions copied with very great labour and zeal at Sanchi, Udayapúr, Ehrin, and other localities within the Bhopal Agency. On examining these carefully one by one, we find that nearly all of any interest have already been published in the Journal; so thoroughly have the antiquities of that neighbourhood been exhausted by the industry of Capt. C.'s predecessors. The subjoined Mithraic hymn from the Vijaya Mandir at Udayapúr, appears however, to be new: the English version is from the pen of our Librarian.

उदयपुरस्य विजयमंदिरश्लोपरिखितं स्तोत्रं ।

॥ औनमः सवित्रे ॥ विवर्तमानसंसारबन्धनातिशयादिहम् । विभां-
तं तिमिराररतिमंशुमन्तमुपास्माहे ॥ ३ ॥ सूर्यादैत्युतिपरिवृजस्तोत्र
मेतद्विविक्षक्षदीमुद्रास्तवकतिलकं प्रोक्तपौराणत्वं । निर्मातुं मां छाश-
मतिमपि अद्धानं प्रबोधप्रौढिप्रादुष्करणनिपुणस्तप्यमानः प्रयुडक्षे ॥
२ ॥ तत्तेजःप्रतिवक्षिकापरिणामेः सर्वखमुण्डाद्ये श्रीतांश्चोः परिपीय
कौशलकलादीस्यैषधीसंपदः । ताः पोद्यूषमुष्वर्बुधेकिलङ्गताल्लख्यामराः
कोर्तनं तत्वं तन्मनसाप्यमेयमहिमं स्वेतत्तुसत्यंत्रुते ॥ ३ ॥ यदनश्वर-
मन्धकां व्यक्तां यच्च विनश्वरं तद्विरूपं तव ज्योतिर्ज्योतिषामीश्वरं
स्तुमः ॥ ४ ॥ यदव्यक्तमणुब्रह्मज्योतिस्तेऽन्तःप्रकाशकं तदेव व्यक्तमनणुज-
गन्मूर्त्याविवर्तते ॥ ५ ॥ संसारप्रतिकामकर्मनिवहोच्चेदात्प्रमोदास्यदं
थानोपार्जितबोधमार्जितमनोरंगत्तरंगायितं ज्ञेयं यत्किलयोगिभिः
कथमपि ज्योतिस्तदेतत्परं ब्रह्मकांतविवर्तमानभुवनाभोगं दिवि द्योतते
॥ ६ ॥ विदन्ति वहिरुद्योति ज्योतिस्ते चर्मचक्षुषः चिन्माचमाङ्गतज्ञान्त
खान्तर्हित्यचक्षुषः ॥ ७ ॥ एतत्त्वदात्मकं विश्वं त्वं वा विश्वात्मकः स्फुटं
संविच्छिरिति तज्ज्ञानमज्ञानं भेदसौहृदं ॥ ८ ॥ कामं कामाद्यरिपरिकर
खंदिताः कादिश्चिका रे लोकाः संश्यविषयनेनाश्रयन्ते भवन्तः ॥
आराध्यैनं सपदि विपदामर्गलं दुर्गपालं किं नाक्षुञ्जं विश्वत विवृतद्वार
निर्वाणदन्तं ॥ ९ ॥

मुखे धर्मकर्मवान् वाञ्छनः सूर्यस्तुतिमान् प्रपश्यन्निर्वाणं ।

Om ! Salutation to Savitá ! We worship the luminary, who is an enemy to darkness, who shines, and destroys the strong shackles of this revolving earth.

2. This eulogium on the unrivalled effulgence of the sun,—a nosegay made of the finest flowers of poetry, and containing *pauránic* allusions, was composed by me, who, though weak-minded, am zealous, and was inspired by Him, who dispenses heat, and is able to develop our intellect.

• 3. O Sun ! the moon having imbibed the rays of thy reflected light attained her wealth of the health-promoting herb,* which produces amrita (nectar) when offered in oblation to the fire, which amrita again is sought by the gods ;—therefore I say, verily thy greatness is inconceivable !

4. Thy visible rays are liable to destruction, but thy invisible rays are eternal, therefore thy rays are two-fold :—O Lord of light ! we salute thee.

5. Thy invisible rays are atomic, and the cause of our soul, and the visible exist in the form of the creation.

6. He, who by eradicating worldly desires becomes the source of conferring happiness, and like a billow plays on the ocean of intellect purified by knowledge and meditation, can be somewhat appreciated only by the devout. That pure light positively is the great Brâhma which shines in the heavens, and is the cause of the happiness of this passing world.

7. The ignorant (lit. film-eyed) believe him to be the light that is seen, but the learned (lit. clear-sighted) know the purifier of minds to be the Great Mind.

8. He, who knows thee to be the life of the world,—or, the world a part of thee,—is a gnyani (learned), but he who thinks otherwise, is a dunce.

9. Ye cowards ! infatuated by worldly passions, and ever actuated by doubts ye take not his protection : Why not by worshipping him, who is a bar to misfortune, approach the contented Commander, who leaves you a wide open door to the stronghold of salvation ?

He attains salvation who prays the sun orally and mentally, and performs virtuous actions.†

The subjoined is the legend of a copperplate grant presented to the Society some time ago by Brigadier Stacy : the translation of this also is by Babu Rajendra Lal Mittra. This grant is remarkable as contain-

* The moon plant (*Sarcostema viminalis*).

† The last sentence is in prose.

ing the genealogy of Sri Venayaka Pála Deva in duplicate, first engraved upon the grant and then cast in relief upon the seal.

ॐ । खल्तिः । श्रीमहोदयसमावासितानेकनौहस्यश्वरथपत्तिसम्पन्नः
 शुद्धाचारः परमवैष्णवोमहाराजः श्रीदेवशक्तिदेवस्तस्य पुच्छत्पा-
 दान्तख्यातः श्रीभूयिकादेव्यामुत्पन्नः परममाहेश्वरोमहाराजः श्रीव-
 न्यराजदेवस्तस्य पुच्छत्पादान्तख्यातः श्रीसुन्दरी देव्यामुत्पन्नः परम-
 भगवतीभक्तोमहाराजः श्रीनागभट्टदेवस्तस्य पुच्छत्पादान्तख्यातः
 श्रीमहीसटादेव्यामुत्पन्नः परमादित्यभक्तोमहाराजः श्रीरामभद्रदेव-
 स्तस्य पुच्छत्पादान्तख्यातः श्रीमद्यादेव्यामुत्पन्नः परमभगवतीभक्तो-
 महाराजः श्रीभोजदेवस्तस्य पुच्छत्पादान्तख्यातः श्रीचन्द्रभट्टादि-
 कादेव्यामुत्पन्नः परमभगवतीभक्तोमहाराजः श्रीमहेन्द्रपालदेवस्तस्य
 पुच्छत्पादान्तख्यातः श्रीदेहनाशादेव्यामुत्पन्नः परमवैष्णवोमहारा-
 जः श्रीभोजदेवस्तस्य भाता श्रीमहेन्द्रपालदेवस्तस्य पुच्छत्पादा-
 न्तख्यातः श्रीमहीदेव्यामुत्पन्नः परमादित्यभक्तोमहाराजः श्रीवि-
 नायकपालदेवः प्रतिष्ठानभुक्तान् बाराणसीविषयसम्बद्धकाशीपारपथ-
 कप्रतिवद्धिटिक्करिकायामे समुपगतान् सर्वानेव यथास्थाननियुक्तान्
 प्रतिवासिनच्चेदमाङ्गापयति, उपरिलिखितयामः सर्वायसमेत आच-
 न्द्रार्कक्षितिकालं पूर्वदत्तदेवब्रह्मदेयवर्जितोमया पित्रोः पुण्याभिष्ट-
 द्धये, दर्भिसगैत्रायाथर्वसब्रह्मचारिभट्टभुज्ञाकाय, घण्टां गङ्गायां च्छा-
 त्वा प्रतियहेण प्रतिपादित, इति विदित्वा भवद्भिः समनुमन्तव्यं, प्रति-
 वासिभिरप्याङ्गाः अवणाविधेयभूताः सर्वाया अस्य समुपनेया इति,
 श्रीहर्षेण प्रयुक्तस्य शासनस्य स्थिरायतः ॥ सम्बत्सराः ६५ भास्फालगु-
 वदि ६ निवद्धं ॥

Om ! Prosperity ! Distinguished by the possession of innumerable war boats, elephants, horses, cars and foot soldiers, (was the reign of)

the pious and Vaishnava (a) Mahárája Srí Devasacti Deva. He was succeeded by his son—born of Srí Bhumiká Devi, the great Máheswara (b) Mahárája Vanyarája Deva, who was followed by his son—born of Srí Sundarí Devi, Mahárája Srí Nágabhatta Deva, a worshipper of Bhagavati. His son, Mahárája Srí Rámbhadra Deva—a worshipper of Aditya, (c) and born of Srí Mahisatá Deví, succeeded him, and was followed by his son—a worshipper of Bhagavatí (d) and born of Srí Madappá Deví, Mahárája Srí Bhoja Deva; who was succeeded by his son, Mahárája Srí Mahendra Pála Deva, a worshipper of Bhagavatí, and born of Srí Chandrabhattáríká Deví. His son, the Vaishnava Mahárája Srí Bhoja Deva, born of Srí Dehanásá Deví, succeeded him. Srí Mahendra Pála Deva was his brother; whose son and successor, born of Srí Mahideví Deví, Mahárája Srí Vinayaka Pála Deva,—a great worshipper of Aditya, to the respectable and permanent inhabitants assembled in Tikkariká, a village situated in the district of Báránasi (Benares), on the opposite bank of Kásí, thus addressed: “The aforesaid village, with all its revenue exclusive of what has been already presented to Devtas or Bráhmaṇas,—for the period of the duration of the sun, the moon, the earth, and time—in order to the promotion of my parents’ virtue, after due ablutions performed in the Ganges on the 6th day of the moon, was presented by me to my class-fellow in the study of the Atharva Veda, Bhulluka Bhatta, of the family of Darbhisa, knowing this you should abide by it and submissively pay to him all the revenue.” Sriharsa composed this to give permanency to the grant.

Done on the 6th day of the dark half of the moon, in the solar month of *Phálguna*, in the year 65.

(a) A worshipper of Vishnu.

(b) Worshipper of Mahádeva.

(c) Sun.

(d) The goddess Durgá, the wife of Shiva.

Addenda et Corrigenda of the paper on the Aborigines of the Sub-himalayas, in the December No. of the Journal. By B. H. Hodgson, Esq.

Page 1237 at the word 'Bhutan,' add foot note. Pemberton in his Report assigns the following position and extent to Bhutan. $26\frac{1}{2}^{\circ}$ to 28° N. L. and $88\frac{3}{4}^{\circ}$ to $92\frac{1}{4}^{\circ}$ E. Long. Length 220, and breadth 90, miles.

Page 1238. Dele the long foot note on Hemachal, and substitute appendix No. I. hereafter given.

Page 1241. For 2000 read 1800; and for 500, 480 as the length and breadth of Tibet.

Page 1242. Dele the 8 first lines and substitute—'That valley is of a lozenge shape, about 20 miles in extreme length and width, cultivated highly throughout, and 4200 to 4700 feet above the sea. Lat. of Cathmundu $27\frac{3}{4}^{\circ}$ N. The only other valley in the whole eastern half of the Sub-himalayas is that of Júmla or Yúmila, which is smaller and higher, yielding barley (*hordeum celeste*) as the greater valleys rice; whilst in the western half of the Sub-himalayas is the single though large vale of Cashmir, 160 miles long by 60 broad, and 6000 feet above the sea.'

The Sub-himalayas form a confused series of enormous mountains, the ranges of which cross each other in every direction, but still have a prevalent tendency to diverge, like ribs from the spinal column of the snows, or a S. E. and N. W. diagonal between 28° and 35° .

Same page. Add at top of the series of basins and of peaks, 'Alpine basin of Indus... No peak'; and alter the subsequent numeral mention of basins, in reference to population, accordingly.

Page 1243, for 'Dijond' read Dijong. Same page line 19, after the words 'aqueous system can alone reveal,' Add, 'Of the innumerable rivers the only ones with ascertained transnivean sources are the Indus, the Satlege, the Karnáli, the Sánpú vel Brahmáputra, and the Arún, whereof the 4 first take their rise at Gangri, the great water shed of the plain of Tibet, close to lake Mepang vel Manasróver, and the 5th or Arún, from the northern slope of Hemachal in the district of Tingri. They are, as might be expected, the largest of our rivers, both the

Karnáli and the Arún, within the mountains, exceeding the Jumna or Ganges.

It is probable though unascertained that the Painomchú and Monas, in addition to the rivers above given, have transhemalayan sources, and are identical respectively with the Pá or Nai-chú and the Monchú of Klaproth, whilst his Kougong is, most likely, the Subhansri, and his petit Tchembo, the Dihong; which last stream, or the Lohit, must be identified apparently with the Sánpú vel Brahmáputra. Permanand, who accompanied Wilcox and Burlton, and explored further than either of them, thinks the Lohit is the Sánpú: Major Hannay contends for the Dihong, which he says is properly called Dhang, a word almost the same with Dzang whence, with the affix po, we derive Sánpú. The great river is styled Dzang-po, recte Tsang-po; that is, of or belonging to Tsang, which is the western half of the central province of Tibet.

It seems possible that the Subhansri, the Dihong, the Dibong, and the Lohit, are, some of them, defluents of the Sánpú, whilst others of them, with separate sources, are affluents. Collectively they must be held, at present, to constitute the Sánpú vel Brahmáputra; for, it is certain that the Sánpú is *not* the Irawádi; nor have we any grounds for assigning an eastern continuation to the former river comparable in validity to those which lead us to make it turn westward and traverse Assam.'

Then add, 'after ruggedness of the surface,' the words 'of the Subhemalayas.'

Comparative Vocabulary, Kirauti, first column, for 'Bhag,' read 'Phag.' Lepchu column, for 'Kazen' read 'Kazen.'

Second page, foot note, for 'Jiming, good,' read 'Jigú, my goods.'

Third page, foot note, for 'expresses in, eu in declension,' read 'expressions in, on, in declension.'

In the next note, for Gnúng, read Gnún.

Newar column, for 'Khau, Da, Ang,' read, 'Khau, Dú, Ang.'

In the last page of the Vocabulary the Lepcha adjectives are given only in one form, whereas there should be two, as Arhúm vel Rhúmbo. Azeu vel Zeubo. Amyen vel Myenbo, &c. One form is as common as the other. But the last is important, as helping the demonstration of the affinity of this tongue to that of Tibet, an unquestionable fact, though denied by the high authority of De Coros. He who can reach

the roots, and separate them from the servile or accessory particles, and can, moreover compare structures as well as vocables, will have no hesitation in affirming the common relationship of all these tongues to the language of Tibet, though the *prima facia* differences are certainly often remarkable, and viewed collectively, not less instructive with reference to the history and formation of dialects.

APPENDIX I.

The vast limitary range of snows to the North of India, has been known in all ages by names derived entirely from Sanscrit, the Greeks and Romans neither coining fresh appellations nor even translating the sense of the Indian ones into their own languages, but adopting almost unaltered the Sanscrit names they found. These are Hemáchal, Hema-achal, snowy mountain. Hemádri, Hema-adri, the same. Hemálaya, Hema-alaya, place of snow. Hemódaya, Hema-údaya, source of snow, (as Suryódaya, source of sun or East). From the last term the Greek Æmodus is deduced without alteration. The following tables, showing the relative height of the great Andean and Hemalayan peaks, and the connexion of the latter with the physical geography of Northern India may prove interesting, since no one but myself I believe is in a position to note the connexion of the snowy peaks with the distribution of waters quoad the Eastern half of this magnificent theatre of Nature's vastest display.

Andean Peaks.	Himalayan Peaks.
Sorato,.....	25,400
Iliniani,.....	24,350
Desya cassada,.....	19,570
Descabesado,.....	21,100
Chimbarazo,.....	21,441
	Nanda Devi,..... 25,749
	Dhavalagiri,..... 27,060
	Gosain than,..... 24,700
	Kanchan Jhinga,..... 24,000
	Cholo, 26,000

HEMALAYAN PEAKS.

Names.	Relations.
No known peak,.....	Basin of Indus, Alpine Panjab.
Nanda Devi (above Rohilkhand),	{ Alpine Gangetic basin, East end. Alpine Karnalic basin, West end.
Dhavalagiri (above Gorakpoor),	{ Alpine Karnalic basin, East end. Alpine basin of Gandac, West end. Naraini.
Gosainthan vet Dayabhang (above the valley of Nepal),	{ Alpine basin of Gandac, East end. Trisul. Alpine basin of Cosi, West end, Sún Cosi.
Kanchan Jhinga (above Sikim),	{ Alpine basin of Cosi, East end, Tamvar. Alpine basin of Tishta, West end, Bomchu.
Cholo (above Bhutan),	{ Alpine basin of Tista, East end, Paimonchu. Alpine basin of Monas, West end, Baréli.

• The latter of the above tables shows with distinctness the connexion that exists between the greatest elevations of the snowy range and the aquatic system of the Sub-hemalayas, so that the great snow peaks are really entitled to be considered *divortiae aquorum* on the Indian side of the snows, whatever may be the case on the Tibetan side: and, it is observable that at those points where the transnivean origin of our rivers necessitates a partial reference of our aquatic system to extra Indian limits, there no such towering snowy peak seems to mark the Alpine Sub-hemalayan basin as in cases where our aqueous system is altogether our own and Cisnivean. Thus we have no peak to define the basin of the Indus on its western or eastern margin. At least, I know of none, though Pargyil may in part be considered a water shed, and so, at the other end of the chain, may Chumalari. Both peaks however are detached and stand on the plain of Tibet. Cholo is near to Chumalari and not detached. Of the innumerable rivers of these regions the only ones with ascertained transnivean sources, are the Indus, Sutlej, Karnáli, Sanpu and Arún, whereof the four first take their rise at Gangri, the great water shed of the plain of Tibet, close to Lake Mepang vel Manasrovar, and the fifth or Arun, from the Northern slope of Hemáchal in the district of Tingri. These 5 rivers are, as might be expected, the largest of the whole, both the Karnali and Arun exceeding the Ganges or Jumna within the mountains, and being nearly equal the one to the other. Gangri is probably the Kailas of the Hindus, whence diverge to the four quarters of the compass the 4 great rivers of Bhárat des. I have said above that only 5 of our rivers have trans-hemalayan sources. It is however probable, though unascertained that the Painom-chú and Monas arise beyond the snows and are identical respectively with the Naivel Pá-chu and the Mon-chú of Klaproth. Chú vel Tchú means river, so that in the one case we have an absolute identity of names, and nearly so in the other (Pá-Pai, the root).

Klaproth's determination, to make the Sanpu something else than the Brahmaputra has led him to overlook the several large streams descending into Bhutan and Assam. Had he been aware that his Shokinja is Sho vel Bhutan, and his Mon vel Moun, the Cis-hemalayans generally, he must have been more accessible to recent evidence against his theory.*

* Mémoires relatifs à l'Asie 3. 370—417 and Map.

With regard to the heights of the Hemalayan peaks, of the 5 given, the two first are Webb's and Herbert's, the 3rd Colebrooke's and the 4th and 5th Waugh's, communicated verbally, the results of his recent operations not having yet been completely worked out. The peak called by me Cholo, Capt. W. supposes to be Chumalari: but the natives say otherwise. Capt. W.'s positions for triangulation* were at 85 miles distance. Capt. Herbert justly observes that, unequalled and vast as is the elevation of the Giants of Hemáchal, no adequate conception of the vast mountain mass can be formed by merely adverting to them. The best way is to contemplate the whole extent and general elevation of the snowy region spreading over some 1800 to 2000 miles, with a breadth or depth of 20 miles, peaks above 5 miles high, distributed throughout *its whole extent*, and passes similarly extended, yet *seldom or never falling below 15,000 feet*: and all this though we admit Humboldt's somewhat theoretic negation of the general opinion that Hemachal, and not, as he contends, Kuenlun, is the chain which divides Asia from end to end!

APPENDIX II.—*On the physical type of the Tibetans.*

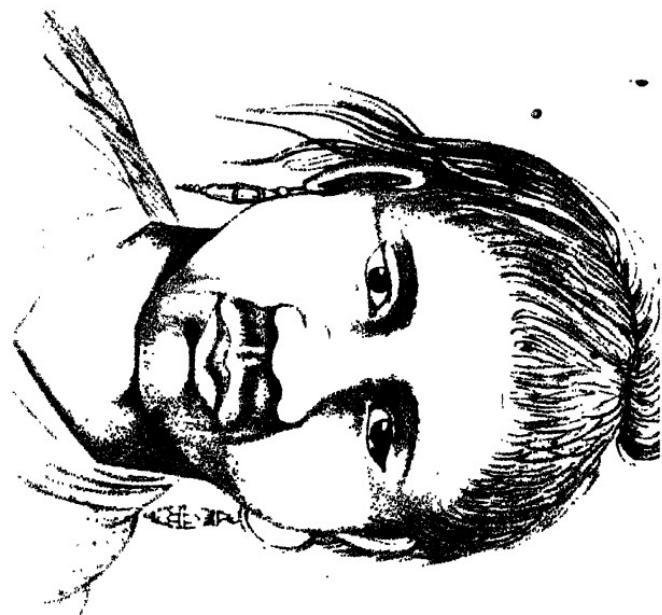
The accompanying profile and full face sketches† exhibit a faithful and characteristic example of the Tibetan race. The person selected to type his countrymen was Phúchung, a native of Digarchi in Utsang, or Central Tibet. He was a fine young man of 23 years, but rather below than above the average height and bulk. Height 5.6, without shoes. Length of head, 0.9½. Girth of head, 1.11½. Crown of head to hip, 2.3½. Hip to heel, 3.0. Breadth of chest, 1.0.0. Shoulder point to shoulder point, 1.3½. Arm and hand, 2.3¼. Girth of chest, 2.90. Girth of arm, 0.10. Girth of thigh, 1.6.½. Girth of calf, 1.2½. Length of foot, 0.9¾. Length of hand, 0.7. Breadth of hand, 0.4.0.

A stout good humoured looking lad, fleshy and broad, but scarcely so tall or massive as the majority of his race. Colour, a full clear brunet, fully as dark as the Sub-hemalayans, nay, more so. No red whatever on the full cheeks (January). Hair of head, thick, black, coarse, straight, copious, cropt except near the crown, where it is plaited

* Tanglo and Singchal in Sikkim, 10 miles apart.

† These came to hand too late for the present number. They will appear in the next.
—Edu.

into a tail that reaches to the hips. Moustache small. No beard Nor any hair on the chest. Nor any whisker. Face large, wide, ovoid, nearly as wide between the cheek bones and angles of the jaws (where the spaces are equal) as long from the top of the forehead to the chin. Forehead low but not very noticeably narrowed or retiring, except by comparison with very fine heads. Frontal sinuses large and the brows consequently, heavy. Hair of the eyebrows and eye lashes, ample. Eyes of good size and form with hardly a noticeable degree of obliquity, but the orbital cavities too much encumbered with flesh which presses on the lids. Iris dark brown. Bridge of the nose sunk to a level between the widely separated eyes, but of good length and well raised elsewhere, though too broad and fleshy, and the nostrils too round for beauty. Zygoma large and salient, and the cheeks full and heavy of flesh. Angles of the jaws likewise prominent and as wide as the cheek bones. Mouth large, with full protruded lips, advanced almost as forward as the tip of the nose, yet well formed and the teeth fine in form, set and colour. Upper lip long, jaws large, chin small and rather retiring, vertical line of the face pretty good, but the mouth the most salient part; the forehead and chin being both slightly withdrawn from the front. Ears large and prominent. Head well formed and round, full enough in the fore part but low. Body well made and well proportioned; massive but not dumpy. Trunk rather long but not awkwardly so, nor the arms at all unduly elongated. Muscular and stout, but the legs superior to the arms in muscular development, expression of the countenance cheerful and pleasing, but the Mongolian cast of features strongly marked.



PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JANUARY, 1848.

ANNUAL MEETING, 12TH OF JANUARY, 1848.

The Rev. Mr. McQUEEN, in the chair.

The accounts and vouchers for December 1847, were submitted.

Henry Alexander, Esq. C. S., was named as a candidate for election at the February meeting, proposed by Mr. Blyth, seconded by R. W. G. Frith, Esq.

Letters were read as follows :—

To the Secretary Asiatic Society.

MY DEAR SIR,—I shall be obliged by your taking my name off the List of Subscribers of the Asiatic Society, until better times come, when I shall be proud again to be enrolled.

Your's faithfully,

WILLIAM THEOBALD.

December 22d, 1847.

From G. A. Bushby, Esq. Secretary to Government of India, Home Department, transmitting copy of a paper by the Baron Des Granges, entitled “A short survey of the countries between Bengal and China, showing the great commercial and political importance of the Burmese town of Bhanmoo, on the Upper Irrawaddy.” (Ordered to be published).

From Wm. Grey, Esq. Under Secretary to the Government of Bengal, conveying the sanction of Government for the enclosure and appropriation of a piece of ground adjacent to the Society’s premises, and lately occupied as a Police Thanna.

From the Officiating Deputy Surveyor General of India, forwarding the Meteorological Register for December, 1847.

From E. C. Ravenshaw, Esq., communicating an abstract statement

of the fall of rain at Patna, during the last $5\frac{1}{2}$ years. (Ordered to be published).

From R. N. C. Hamilton, Esq., Resident at Indore, forwarding a facsimile impression from two copper tablets dug up in the vicinity of the town of Oojein, with a translation by the Librarian, Rajendralal Mittra. (Ordered to be published).

From R. McIvel, Esq. forwarding a fine specimen of Carbonate of Strontia, found at Sialla.

From J. W. Laidlay, Esq., enclosing a note of the daily rate of evaporation in Calcutta in 10ths. and 100ths. of an inch, from January to December, 1845.

From D. Cunliffe, Esq. Magistrate of Monghyr, announcing despatch of eight ancient Hindu coins recently found in his district, and which are surmised to have been in circulation in the reign of the great Vikramaditya.

From the Moulvi Abdoolah, proprietor of the Indian Press, offering several works published at his own and at the Lucknow Presses, and deficient in the Society's Library, in exchange for the Fatawe Alumgiri, Sharya ul Islam and Tarikh-i Nadiri. (Referred to the Oriental Section.)

From Charles Huffnagle, Esq. submitting extract of a letter from the President of the Academy of Natural Sciences of Philadelphia, who is desirous of obtaining certain volumes of the Journal and Researches, deficient in their collection. It was unanimously agreed that the volumes specified be presented to the Academy through Mr. Huffnagle.

From Mr. H. Piddington, presenting a copy of his Horn Book of Storms for all parts of the world.

From Mr. Piddington, a brief paper on the Nizam's Diamond, for publication in the Journal.

From Col. Ouseley, through Mr. PIDDINGTON.

I have the pleasure to send one of two Iron Cramps I find adhering to the stories of the old Hill Temple at Rampore in Surguja. I dare say the Iron is good, but it must be thousands of years old.

Yours very sincerely,

J. W. OUSELEY.

The Annual Report of the Council of the Society for the year 1847, having been read by the Senior Secretary, and the accounts for the year submitted, it was moved by Dr. O'Shaughnessy, seconded by Mr. Laidlay, and agreed unanimously, that the Report and Accounts be

printed and circulated to the members, and brought up for final consideration at the February meeting.

The meeting then proceeded to the election of Office-Bearers for 1848, when the following gentlemen were chosen:—

PRESIDENT—J. W. Colvile, Esq. Advocate General.

VICE PRESIDENTS—The Lord Bishop.

The Hon. Sir John P. Grant.

H. M. Elliott, Esq. C. S.

J. W. Laidlay, Esq.

COUNCIL—G. A. Bushby, Esq., Welby Jackson, Esq.,

W. P. Grant, Esq., Capt. A. Broome, S. G. T.

Heatley, Esq., W. Grey, Esq., R. W. G. Frith, Esq.,

Lord Arthur Hay, Dr. Walker,

W. Seton Karr, Esq., Dr. Jas. Dodd.

SECRETARIES—W. B. O'Shaughnessy, Esq., J. W. Laidlay, Esq.

Dr. E. Roer, *Oriental Department*.

The permanent officers remaining as before. During the election the Senior Secretary stated that it had been ascertained by the Council that the Bishop of Calcutta is prevented by the state of his health and his public duties, and Sir J. P. Grant by his intended departure—from accepting the office of President—and that 27 members had addressed a requisition to the Council for the nomination of Mr. Colvile to the office vacated by Lord Hardinge's departure.

LIBRARY.

The following books have been received since the last meeting.

Presented.

Horary Meteorological Observations made at the Hon'ble the East India Company's Magnetical Observatory at Madras. By Capt. S. O. E. Ludlow.—**BY THE MADRAS GOVERNMENT.**

Die Kaukasischen Glieder des Indoeuropaischen Sprachstomms. von Franz Bopp.—**BY THE AUTHOR.**

Rapport Annuel fait a la Société Asiatique dans sa seance Generale, du 14 Juin, 1847. Par M. Jules Mohl.—**BY THE AUTHOR.**

The Calcutta Christian Observer for December 1847, and January 1848.—**BY THE EDITORS.**

The Indian Atlas, Nos. 50, 56, 79, and 107.—**BY THE GOVERNMENT OF INDIA.**

The Oriental Christian Spectator, Vol. 8, Nos. 11 and 12.—**BY THE EDITOR.**

Tatwabodhiní Patricá. Nos. 52, 53.—**BY THE TATWABODHINI SABHA.**

- The Annual Report of the Tatwabodhini Sabhā for the year of Sakáditya 1769.—**BY THE SAME.**

Nityadharmaṇuranjicá, Nos. 39 @ 48.—**BY THE EDITOR.**

The Oriental Baptist, No. 13.—**BY THE EDITOR.**

The Upodeshaka, No. 13.—**BY THE EDITOR.**

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of November 1847.—**BY THE OFFICIATING DEPUTY SURVEYOR GENERAL.**

The Sailor's Horn-Book for the Law of Storms; being a practical exposition of the theory of the Law of Storms, and its uses to Mariners of all classes in all parts of the world, shown by Transparent Storm Cards, and Useful Lessons. By H. Piddington F·q.—**BY THE AUTHOR.**

Mémoires de la Société Royale des Antiquaires du Nord, 1845—47.—**BY THE SOCIETY.**

Antiquarisk Tidsskrift, udgivet af det Kongelige Nordiske Oldskrift—Selskab, 1843—45.—**BY THE EDITOR.**

Exchanged.

The Athenaeum, Nos. 1043-44.

The Edinburgh New Philosophical Journal, No 86.

Journal Asiatique, 4me Série, Nos. 445-6-7.

The London, Edinburgh and Dublin Philosophical Magazine, No. 209.

Purchased.

The Annals and Magazine of Natural History, Nos. 133-4.

The North British Review, No. XV.

Comptes Rendus, Hebdomadaires des Séances de l'Academie des Sciences. Tome XXIV. et XXV. Nos. 1 à 16.

Journal des Savants. Aout et, Septembre, 1847.

Histoire Naturelle des Poissons, par M. Le Baron Cuvier, et par M. A. Valentiniennes. Tome XX.

*Report of Curator, Zoological Department.**

The donations received by the Society since its last meeting are as follow:—

1. Rustomjee Cowasjee, Esq. A dead female Ostrich, which has been mounted as a stuffed specimen, and the bones also are preserved. A fine skeleton of a male is likewise in the museum (IX, 727).

2. Baboo Rajendro Mullick. A living adult female Monkey, of a species nearly allied to *Macacus cynomolgus* and *M. carbonarius*, the habitat of which remains to be ascertained. This animal resembles *M. cynomolgus*, except that (as in *M. carbonarius*) there is no sign of crest upon the vertex, and it is parti-

* For December, 1847. The Zoological Curator's Report for November, 1847, was printed with the 'Proceedings of the Society' for December of that year.

cularly distinguished by its long and erect greyish beard and whiskers, surrounding the face, with the help of a considerable fringe of projecting hair upon the brows, causing the eyes to appear deep sunk and altogether imparting a very peculiar physiognomy. Also the living Squirrel, No. 14 a, described in XVI, 872.

3. The Raja Buddenath Roy. A dead female white English Turkey, equaling in size the males of the race bred in this country. The specimen has been mounted; and I have presented the Society with a fine male of the same breed, which has been prepared as a skeleton.*

4. Mr. Birch, of the Pilot Service. A variety of *Crustacea* procured at the Sandheads, comprising some interesting specimens, and among them some of a "Crab allied to *Gonoplex* and *Mactrophthalmus*, which is new to the Society's collection.

5. From the Barrackpore menagerie. A fine dead specimen of a Lory (*Eos ornata*).

6. Mr. W. Johnson. A young living Monkey, of the species *Macacus radiatus*.

7. Major Jenkins, Gowhatu. A perfect skin of a black Leopard; and skins of various species of *Anatidae*.

8. Capt. E. F. Smith, 2nd Command 1st Assam Lt. Infantry, Sadyia. A skin of *Felis marmorata*, Martin, and one of *Sciurus bicolor*: Assam being a new locality for the former species; and a variety of *F. bengalensis* occurring there, which is apt to be mistaken for *F. marmorata*. This variety is the *F.*

* The Turkies of Bengal, or more properly of Chittagong (where great numbers are bred), are of small size, with the pendulous appendage and wattles of the head and neck greatly developed. Degenerate in the extreme from the wild race of America, they are incapable of flight, and are singularly helpless and dependent. If suffered to drink at will, they will continue sipping till they distend their huge craws, and inconvenience themselves not a little by so doing. They are almost invariably black, which was doubtless the colour of their imported ancestors. But for the table they are excellent, and in great demand; and most of those brought hither from Chittagong are purchased by people of French descent, who fatten them at Chandernagore for the Calcutta market. In Calcutta, the reputed Chittagong Turkies are at a discount, for it is not generally known that the Chandernagore birds are received from Chittagong in the first instance: the management, however, of the newly imported Chittagong Turkies is little understood in Calcutta. Although this bird was necessarily unknown in the Old World before the discovery of the New, it is regarded by the Mussulmans of India as unclean, the tuft of bristles on its breast inducing them to suppose that it partakes of the nature of the Hog: moreover, the bare head and neck of the Turkey imparts a somewhat Vulturine appearance, which may well help this prejudice in the East; and it is worthy of remark, that some English Turkies which I possessed would constantly associate with a pair of the *Otogyps pondicerianus* that were secured each by a chain, themselves evidently assuming the degrading consanguinity.

•*Charltoni*, Gray, v. *Ogilbii*, Hodgson, and is connected by intermediate grades of variation with ordinarily marked individuals of *F. bengalensis*.* As compared with Malacca examples of *F. marmorata*, the skin from Assam is more fulvous than usual, and the markings somewhat more nearly approximate those of *F. macrocelis* (v. *Diardii*) ; but the much smaller size of the feet at once distinguishes it from that species, whether old or young : the under-parts are also whiter than usual, spotted with fuscous-brown ; and the dark markings of the tail are rusty-brownish instead of black. Nevertheless, the species is decidedly true *F. marmorata*.

9. Mr. Pinson, of the 'Precursor' S. V. A living young female of *Gazella dorcas*, from Aden.

10. R. W. G. Frith, Esq. Some skins of Malacca birds, comprising the novelties described in my Report for September last (XVI, 1179). Also a young specimen of what I consider to be *Tupia javanica*, Horsf., from Malacca, identical with *T. peguana*, Lesson, from Arracan and Tenasserim, and quite distinct from the ordinary *T. ferruginea*, Raffles, of the Malayan peninsula, which alone is included in Dr. Cantor's list.† Among the birds presented, are the *Alcedo nigricans* and *Batrachostomus affinis* ; *Spizaetus nipalensis* (*niger*) ; and *Buceros rhinoceros* with half-grown casque, *B. malayanus* (v. *bicolor*, v. *anthracinus*? Tem., with white supercilia), *B. nigrirostris* (fæm.), and *B. carinatus* (v. *galeritus*? Tem., juv.) ; also *Philemona velutum* (*Drymophila velata*, Tem., v. *Muscicapa pectoralis*, A. Hay), and two or three other small species.

11. Mr. E. Lindstedt. A specimen of the common *Megaderma lyra*, procured in the Soonderbuns.

12. J. W. Laidlay, Esq. An exceedingly rusty-tinged specimen of *Presbytis entellus*, procured in the vicinity of Junghapore ; also some skins of *Paradoxurus typus*, F. Cuv., and sundry other specimens, comprising the skin of a young *Pteromys* from Cherra Poonjee. This I recognise as of the large Assamese race mentioned in XVI, 866, 868 ; but would like to examine and compare more specimens of it, before asserting its peculiarities of colouring to be constant. It seems intermediate to the grizzled variety of *Pt. magnificus* and the *Pt. oral* of peninsular India. From the former (like *Pt. albiventer*, v. *innotatus*), it differs

* Some time ago, Major Jenkins favored us with living specimens of *F. bengalensis*, both of the ordinary marking and of the variety referred to, which have since died and are mounted in the Society's museum ; and I have now received, from Mr. Elliot, for transmission to Barrackpore, a living specimen of his *Wagati Cat* of the Eastern Ghâts, termed *Leopardus Elliotti* by Mr. Gray ; and I do not consider that this differs specifically : the markings of the individual being merely of a somewhat bolder pattern than usual, and more filled up with black than I remember to have seen previously.

† That a *Tupaia* exists in Central India, I was informed some time ago, I think by Capt. Tickell ; and it has now been procured by Mr. Walter Elliot.

in the absence of the great pale patch upon the shoulders ; the anterior toes and the entire hind-feet are black ; the tail is grizzled like the back to near its tip, which is largely terminated with black, and less abruptly so than in the Himalayan races ; the under-parts are strongly tinged with rufous-brown ; and the general hue is darker than in the grizzled variety of *Pt. magnificus*, and more grizzled with pure white than in *Pt. albiventris*. Whether it would attain the size of the latter cannot be determined from the present young specimen, though I think I can safely aver that it does so ; and, upon the whole, it more resembles *Pt. albiventris* than the grizzled variety of *Pt. magnificus*, although very closely allied to both of these named *Pteromydces*.

E. BLYTH.

Mr. Blyth's Supplementary Report refers to the Society's collection of African Vertebrata, which were exhibited to the meeting.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of Dec. 1847.

JOURNAL
OF THE
ASIATIC SOCIETY.

FEBRUARY, 1848.

*Correspondence of the Commissioners deputed to the Tibetan Frontier ;
communicated by H. M. ELLIOT, Esq., Secretary to the Government
of India, Foreign Department*

*From Capt. A. CUNNINGHAM, Senior Commissioner, Tibetan Frontier,
• To Lieut.-Col. H. M. LAWRENCE, C. B. Resident, Lahore.*

Dated Camp Haulé, 15th Sept. 1847.

SIR,—I have the honor to report to you that Dr. Thomson and myself arrived at this place yesterday, Lieut. Strachey having left us on the morning of the 12th to proceed by a somewhat more circuitous route, by following the course of the Pârang River for a few days, instead of proceeding direct to Haulé.

2. On our arrival here, we found two persons, named Angchoo and Gyabo, who had been sent to meet us by the Garpan of Gâréé, on the receipt of our letter to his address, despatched from Khyuré (copy of which was forwarded to you with my last letter No. 2 of the 29th ultimo). These persons reported that they had been sent to meet us by the Garpan, who had directed them to return to Gâréé with any orders that we might give them,—or, in the event of our not giving them any orders, to return at once. On being questioned regarding the Sirdars who were reported to have arrived from Lassa, they stated that one Sirdar, named Khalun Shakchoo, had arrived for the purpose of settling some revenue matters; that when they left Gâréé he was preparing to return to Lassa, and that by this time he must have set out

•from Gáréé. On being further questioned, they stated that no Sirdar had arrived at Gáréé for the purpose of pointing out the ancient boundary between Ladák and the Chinese territory. As these men were despatched by the Governor of Gáréé, their statement may be taken as a full confirmation of the report, which I mentioned in my last letter, that no Chinese boundary Commissioners had arrived at Gáréé.

3. In the absence of any Chinese boundary Commissioners, we are left to follow out the instructions contained in the 5th para. of Mr. Secretary Elliot's Letter, No. 249 of 27th July last, to my address, "that the Commissioners should individually use their best endeavors to increase the bounds of our geographical knowledge." It was with this view that Lieut. Strachey, continued his course down the Parang river, while Dr. Thomson and myself took the direct road to Haulé, over the Lanak Pass. I annex a sketch map which will show the route which we have already surveyed, and those which we propose to follow as far as Leh. From Dunyar, on the Parang river, Lieut. Strachey will follow the course of the stream as far as Akché; we shall thus obtain an actual survey of the whole course of the Parang, or Para river, with the exception of about 25 miles between Akché and Khyuré. From Akché Lieut. Strachey will proceed to Haulé, over the Budhpú Pass, and so connect his survey with mine.

4. From Haulé Dr. Thomson and myself propose to follow the course of the Haulé river to its junction with the Indus, thence passing by the sulphur and borax mines, (which we shall carefully examine) we will take the high road to Leh by the Tung lung Pass and Giah. This was the arrangement that was agreed upon with Lieut. Strachey, before he parted from us : as by the time that he will reach Haulé, the season will be so far advanced that the only road open to him will be that along the bed of the Indus, which will accordingly survey down to Leh ; we shall thus have two routes surveyed in detail from Haulé to Leh. If, however, Lieut. Strachey should be able to penetrate to the eastward from Haulé, according to his instructions, he will inform me of the same, and Dr. Thomson and myself will then take the river road, and survey the course of the Indus from the borax mines down to Leh.

5. I beg further to report to you that neither of the Agents appointed by Maharajah Gulab Singh, has yet arrived, nor have we any certain intelligence of their approach. Had there been any Chinese Commiss-

sioners on the frontier, the absence of the Maharajah's Agents would have prevented us from settling any portion of the boundary during this season. As there are, however, no Chinese Commissioners, the absence of the Maharajah's Agents, Meean Jowâhir Singh, and Mehtâh Bustee Ram, has only occasioned us much inconvenience in procuring coolies and supplies. Their absence appears to me to be unaccountable; for, on the 6th instant, I received a letter from Lieut. Taylor, your assistant in Kashmir, dated the 3rd of August, informing me that Meean Jowahir Singh and Mehtâh Bustee Ram, had been appointed by the Maharajah to meet the Commissioners at Haulé. As the distance between Kashmir and Leh is only 20 days' journey, even for laden coolies, Meean Jowahir Singh should have been at Leh by the 23rd of August, and allowing him 3 days halt at that place, both he and Mehtâh Bustee Ram, the Thânadar of Leh, might easily have reached Hau-lé by the 10th of this month.

6. Herewith I have the pleasure to enclose a diary* of our marches from the 29th of August, to the 14th of September, the date of our arrival at Haulé, in transmitting which I beg to observe that we have not halted for a single day during the whole of that period.

7. Trusting that our arrangements, both past and future, may meet with the full approval of the Right Honorable the Governor General,

I have, &c.

(Signed) ALEX. CUNNINGHAM,

Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Haulé, 15th September, 1847.

(True Copy)

H. M. LAWRENCE,

Agent and Resident.

From Capt. A. CUNNINGHAM, Senior Commissioner, Tibetan Frontier.

To Lieut.-Col. H. M. LAWRENCE, C. B. Resident, Lahore.

Dated Camp Lé, 9th October, 1847.

SIR,—I have the honor to report to you that Dr. Thomson and myself arrived at Lé, the capital of Ladâk, on the 2nd instant, since which we have halted up to this day for the purpose of observing the Meteo-

* As a more convenient arrangement for the reader, we have thrown together, in the sequel, the various diaries alluded to in the correspondence.—F.D.S.

rological and Magnetical instruments, and of collecting as much information as possible regarding the country and people. Hourly observations of the meteorological instruments and of the declinometer have been recorded for two days; and the magnetic dip and horizontal force have likewise been determined. The latitude of Lé has been fixed by 7 meridian altitudes of the Sun, by about 30 equal altitudes of the Sun, and by several altitudes of the Pole Star; and its longitude has been obtained by the observations of the solar eclipse of this day.

2. We purpose to leave Lé to-morrow morning by two different routes. Dr. Thomson will proceed to Nubra, and up the Shayok river to its source; and, if possible, he will cross the Karakoram range for a few marches to the northward, on the Yarkand road; after which he will return by the Shayok river and follow its course down to Iskardoh. I have furnished him with a sextant and a surveying compass of my own; and I have no doubt he will be able to map his route with considerable accuracy.

He has also minimum and boiling-point thermometers, as well as solar radiation and dry and wet bulb thermometers.

3. I will myself take a southerly route by following the Indus for a few marches to Khalets or Kulutsí, and thence to the Drás river, which I will survey to its source. From Drás, if the passes remain open, I will proceed by the Pilyl [or Pileel] rivulet, an eastern feeder of the Kishen-Gunga river, to Astor or Hasora, and down the Hasora river, and across the Indus to Gilgit. If, however, the western passes should be closed at the head of the Drás river, I will then proceed through the northern part of Kashmir to the head of the Kishen-Gunga river, and thence by the Hasora river to Gilgit.

4. We have chosen these routes to the north and south of the course of the Indus, in order that we might not go over the same ground as Lieut. Strachey; who from the lateness of the season at which he will arrive at Lé, will be obliged to take the river route. We shall thus have three distinct routes surveyed from Lé towards Gilgit.

5. Of the necessity of surveying any lines of country which have been traversed by Trebeck and Vigne, I need produce no other proof than the disagreement between their maps. To the general accuracy of Trebeck's survey I can speak personally: as on three different occasions, in 1839, in 1846, and during the present year, I have myself surveyed

portions of his route. I have likewise, during the past year, surveyed many portions of Vigne's route ; and I am thus able to state positively that his surveys are in many places erroneous. The following instances will be sufficient to show the inaccuracy of his map. 1st. In the Kangra district, he conducts the Guj river from Rihlee into the Bân-Gunga, beneath the walls of Kangra : whereas the Guj follows an independent course, and falls into the Byâs several miles below the confluence of the Bân-Gunga. 2nd. In the map accompanying Baron Hugel's travels [which is only Vigne's map with the Baron's route inserted] Vigne's position of Kruhim or Mori-Muhul differs from the Baron's position of Muhul by 10 miles. To the general accuracy of the Baron's route from Bilâspur to Nadon and Nûrpûr, I can also speak personally ; and I am therefore able to state that Vigne's position of Mori-Muhul is undoubtedly wrong. Mori is a village, and Muhul is an old ruined palace just above it ; whereas Kárúhi, the residence of Raja Ranavir Chund of Kotoch, is two miles distant from it. Vigne is therefore doubly wrong ; in the name as well as in the position.

6. In selecting a route which will conduct me by the head of the Kishen Gunga river to Hasora, I believe that I shall best fulfil the intentions of Government as detailed in the instructions furnished to me in Mr. Secretary Elliot's Letter No. 249 of the 27th of July last to my address ; in which I am directed to follow out my own antiquarian pursuits, as well as to increase our geographical knowledge. At the head of the Kishen-Gunga river, there is a district named Pakhtâwar ; which, from its proximity to Kashmir is, I have no doubt, the original seat of the Pakhtâns (or Afghâns). Our earliest authority for coupling the Afghans and Kashmiris together is Herodotus, whose city of Kas-papuros (called Kaspatus by Isidor of Charax, and Spaturos by the Peningarian Tables) I would correct to Kâspâkturos ; that is, the city (or country,) of the Kás and Pakhtâns (the Kashmiris and Afghans).

The similarity of features of the two people would alone argue their common origin : but their former juxta-position, the one on the Jehlam and the other on the Kishen-Gunga, places the point (in my opinion) beyond dispute. The fact of their diversity of language is easily accounted for. The Pakhtâns, who are only a branch of the Kás tribe, preserved their peculiar language and customs in the mountainous country which they occupied ; whereas the language and the customs of the

'Kâs proper, were both lost in those of the more civilized Hindus, whom they had conquered. Such has in fact been the case in Persia and in India from the earliest times. The Mogals of Jenghiz Khân and Hulâka have long since disappeared in Persia, while their fellow-countrymen, the Hazaras of the Hari river, still speak Mogali.

7. Ilasora, I believe to be the country of the Abisares of Alexander's historians, on account of its proximity to the Dardu districts, as it is always coupled with the Dards by Sanskrit writers—In Yasin and Gilgit, (called Gilit by the people themselves,) I believe that we have the Arsagalitæ of Pliny still preserved. To the south of the Dards again lies the country of the Gakars, whose ancient as well as whose modern capital was Dângali, which I have no doubt gave its name to the Dangale of Pliny. These, as well as the site of Aornus, are a few of the interesting archeological points which I propose to investigate during my survey of these countries.

8. I have not yet had time to digest and arrange the information which I have collected regarding Ladâk : but I may mention that its present name is a modern one, the ancient name being Mâ-yul.

Lé also is a modern capital, the ancient metropolis having been at Shé, now a large village 8 miles to the south-eastward of Lé.

9. Herewith I have the pleasure to enclose my Diary of our proceedings from the 16th of September up to this date.

I have, &c.

(Signed) ALEX. CUNNINGHAM,

Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Lé, 9th October, 1847.

(True Copy)

H. M. LAWRENCE,

Agent and Resident.

*From Capt. A. CUNNINGHAM, Senior Commissioner, Tibetan Frontier,
To Lieut.-Col. H. M. LAWRENCE, C. B. Resident, Lahare.*

Dated Camp Blij-Bihâra in Kashmir, 14th Nov. 1847.

SIR,—I have the honor to report to you that I arrived in the city of Kashmir on the 2nd instant, having been prevented by continued falls of snow from following the route by the Tilêl valley to Garês, as

I had intended to have done when I last reported to you in my letter No. 6, dated Molbil, 20th October, 1847.

2. On the 23rd and 24th of October the snow (which had been falling on the heights for some days) began to fall in the valley of the Drâs river, and when I reached Drâs on the 25th ultimo I found that the passes to Garés and Iskardoh were completely closed. As the weather was still very threatening, I determined to proceed at once to Kashmîr. I therefore marched the next day to Matêñ, through a heavy snow storm. The snow continued to fall the whole night, and the next day I made a march of 16 miles over the Seoiji-lâ into Kashmîr through snow and hail. On the three following days I continued to march down the valley of the Sind river through snow and mud : the snow having fallen down to a level of 6,000 feet for six consecutive days. On my arrival in Kashmîr I found that all the passes, excepting three, were closed for the season, unless some continued fine weather should follow.

3. The three passes which remained open were : 1st, the Banahal Pass, by which the Lahore Dâk travels ; 2nd, the Baramula Pass, by which the Jehlum leaves Kashmîr ; and 3rd, the Seoiji-lâ, or Drâs Pass, by which I had entered the valley. The Garés Pass was completely closed : in consequence of which Mr. Agnew, Lieutenant Young and Mr. Winterbottom, who were returning from Gilgit, have been obliged to go round by Iskardoh and the Drâs Pass. Even the Pir Panjal Pass, which usually remains open throughout November, has been closed since the 25th of October.

4. Under these circumstances, as the only available route to the Dardu country was via the Baramula Pass, which continues open throughout the year, it appeared to me that the best plan which I could follow for the prosecution of the various objects of the Mission, would be to pay a short visit to the principal architectural antiquities of Kashmîr, with the view of measuring them and of describing them in detail. For this purpose I left the city of Kashmîr on the 8th instant, and I am now on my way back, having visited the various ruins at Pandretan, Avantisur, Bij-Bihâra, Mârttand, and the caves of Bhoma-jo ; of all of which I have made plans and elevations by measurement, which will hereafter be submitted to Government. At present, I need only record my opinion that the style of architecture, exhibited

in these ancient temples of Kashmir, is distinguished by great elegance of design, combined with extreme solidity of construction. It is infinitely superior to any thing that I have seen in India; and from the simplicity of its outlines, and the beauty of its proportions, I think it may be ranked as an order of architecture not much inferior to our own classic models. I annex an elevation of one of the pillars of the temple of Mārttand. It is a polygon of twenty fluted sides.

5. During my stay of five days in the city of Kashmir, I set up the decimation magnetometer and the dip-circle, and I made hourly observations of the meteorological instruments for two days. I also obtained four meridian altitudes, as well as several equal altitudes of the sun, and a few observations of the Pole star for the latitude; and the lunar distance of Venus for the longitude. I was also fortunate enough to procure copious Vocabularies of two of the three dialects of the Dardū language, viz. the Shimā, spoken in Gilgit and Hasora, and the Khajnā, spoken in Hunza and Nager. The remaining dialect, the Armya of Chitrāl and Yasan, I expect to obtain without any difficulty amongst the Dardus on the Kishen-Gauga. I will hereafter compare them with the Persian, Pashtu, Sanskrit and Hindī: but, from a cursory examination of the two above dialects, I should say that they consist chiefly of Sanskrit and Hindī.

6. I expect to reach the city of Kashmir on the 18th, where I shall again observe the various instruments; and, after a halt of a few days for that purpose, I intend to proceed via the Baramula Pass, to Mozufarabad, and thence up the Kishen-Ganga river as far as may be practicable at this season. On my route to Baramula I shall visit the ruins of Pahárispur and Patan.

7. I have been so continuously occupied since I reached the city of Kashmir that I have been unable to prepare a Diary of my marches: but I will transmit this document along with my next report.

I have, &c.

(Signed) ALEX. CUNNINGHAM,

Bt. Capt. Senior Commissioner, Tibetan Frontier.
Camp Bij-Bihara, 14th November, 1817.

(True Copy)

H. M. LAWRENCE,

Agent and Resident.

**From Capt. A. CUNNINGHAM, Senior Commissioner, Tibetan Frontier,
To Lieut.-Col. H. M. LAWRENCE, C. B. Resident, Lahore.**

Dated Camp Gingal; 15 miles west of Baramulla, 1st Dec., 1847.

SIR,—I have the honor to report to you that I reached this place yesterday, and that I have been detained here to-day from want of porters, which the Bamba-Chief, Sultan Zuburdust Khan, professes his willingness to give; but which his servants appear to be making no exertions to procure.

2. Herewith I have the pleasure to enclose the Diary of my marches and proceedings up to the present date. From a perusal of this document it will be seen that during my short stay in Kashmir, my attention was principally directed to the measurement and illustration of its architectural antiquities, and to the acquirement of precise information upon points regarding which different authors are at variance; and I am happy to say that my researches have been attended with success.

3. I have discovered, beyond all doubt, the exact position of the ancient capital of Kashmir in Pandritan, which is the local corrupt form of the Sanscrit name Puranadhisthana, or Puranadhithan, the "old chief city." In A. D. 1032 Abu Rihan Al Biruni states that the capital of Kashmir was named "Addistan," and that it was four far-sangs from a great lake, certainly the Waller of the present day. Four hundred years earlier, in A. D. 640, the Chinese pilgrim Huan Thsang states that the old capital was on the river to the south-east of the new city. Now we know that the present Srinagar was built by Pravarasena, who reigned from A. D. 432 to 464. Huan Thsang's description of the ancient city, therefore, corresponds with the actual position of Pandritan, which is to the south-east of the present town. But to put this point beyond all doubt I may state that in an old abridged copy of the Raja Taringini, which has marginal notes identifying the ancient cities under their Sanscrit names, with the more modern appellations of the corrupt spoken dialect of Kashmir, I found an account of the building of a temple by Nirjita Verwma in A. D. 920—921, at Puranadhisthana, which name in the original notes is identified with Pandritan.

4. I have also been fortunate enough to discover another point of much interest and importance in the comparative geography of the countries to the northward of Kashmir; which is the identification of

the ancient country of Bolor with the present Balti, or Little Tibet. The Bolor mountains have occupied an uncertain position in our maps for a considerable period, which I am now able to define with precision. They are in fact that chain of mountains, hitherto called the Muztak, which forms the northern boundary of the district of Balti. Amongst the Dards who speak the Shina language, namely, in Hasora, Gilgit, Chilas, Darel, Kohli and Palas, all lying along the Indus, Balti is known only by the name of Palolo. What renders this identification more striking and complete is the mention by Huan Thsang in A.D. 640, that the kingdom of Polulo "produced much gold :" a production for which Balti or Palolo is still celebrated, and which is one of the chief sources of its revenue.

5. But the most valuable discovery which I have made since my last report, dated the 20th ultimo, has been the acquisition of three new Sanscrit Dramas, two of which were hitherto known to us only by name ; and the third was altogether unknown. Copies of these Dramas are now being made ; which, when completed, will be forwarded to Government. The Dramas are the following :

1. *Anergha-Raghava*, a long work, written by Murara-kavi, a Kashmirian brâhman. In this piece, as its name imports, the principal exploits of Rama are dramatized. It is one of the hitherto lost plays of which Professor Wilson had obtained only the name.

2. *Sringara-Tilaka*, a short piece written by Sri Rudra-kavi, a Kashmirian brâhman. This would appear to be a sort of monologue, in which one actor successively describes and personates the characters of various women. It is another of the hitherto lost plays of which Professor Wilson had obtained only the name.

3. *Vasavadatta-cheritra*, a short piece, hitherto entirely unknown, written by Suban-du-kavi, a Kashmirian brâhman. In the Retnavali (also a Kashmirian drama) which has been translated by Professor Wilson, (Hindu Theatre, vol. 2) the heroine is likewise named Vasavadatta. In that play, however, she is the Rani or Queen of Vatsa, the Raja of Kausanebi. All the other characters are different, as will be seen by the forthcoming list of the dramatis personæ of this new play :

1. *Chintamani*, Raja of Kusumapura.
2. *Kandarpaketu*, Son of the Raja.
3. *Sringara-sekhar*, a Kshatriya, father of Vasavadatta.

4. *Anangarati*, mother of Vasavadatta.
5. *Vasaradatta*, beloved by Kandarpaketu.

I have, &c.

(Signed) ALEX. CUNNINGHAM,

Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Gingal, 1st December, 1847.

(True Copy)

JOHN LAWRENCE,

Officiating Resident.

*From Capt. CUNNINGHAM, Senior Commissioner, Tibetan Frontier,
To JOHN LAWRENCE, Esq. Officiating Resident, Lahore.*

Dated Camp Hazroo in Chach, 18th December, 1847.

SIR,—I have the honor to report to you that I reached this place yesterday via Mozafarabad and the Hazāra country, through six days of snow and ten days of rain. Herewith I beg to forward a diary of my marches up to this date.

2. In my letter No. 8 of the 20th ultimo, I reported to you that I intended to communicate with Doctor Thomson from Mozafarabad, but on my arrival there, I found that owing to the continual fall of snow all the passes towards Gilgit had become closed for the season, and I could not find any one who would undertake to convey a letter to Gilgit, or even to Chelās on the Indus. For the same reason I was obliged to relinquish my intended exploration of the Kishen-Gunga river; but this I regret the less as I understand that the whole course of the Kishen-Gunga has during this year been examined by Mr. Vans Agnew.

3. Under these circumstances I took the only route left open to me through the Dhamtāwar and Hazāra districts; and I have the satisfaction to report to you that I have discovered the ancient names of these two districts in the times of Alexander the Great and Ptolemy the Geographer. As these are two points of much interest and value in the comparative geography of the Punjāb, a few details regarding them may perhaps be acceptable.

First. The present Hazāra district is the actual country of King Abisares of Alexander's historians. Its identification is established by the following statements of ancient authors. Abisares was King of the

Bergindhi, that is of the people inhabiting the rich Hazâra valley of Ver-gund. The Soamus river had its rise in the mountainous parts of Sabissa (or Abisâra), or using the modern names, the Swân (or Sohan) river has its rise in the hilly parts of the Hazâra country. Lastly, the people to the northward of Peshâwar fled across the Indus into Barisades (or Abisares) for security ; that is they took refuge in the Hazâra country.

Second. The present Dhamtâwar district, called Kash by the people of the country, is the *Varsa*-regio of Ptolemy, which he places in the hilly part of the Doâb, between the Indus and the Jehlam. This district is mentioned at a later date, in A. D. 640, by the Chinese Pilgrin Hwân Thsâng, as U-la-shi ; and at a still later period, in A. D. 900, the Raja Taringini records that Sankara Vermma was killed by an arrow on his return from an expedition in the Urasa country.

4. These successful identifications, together with those reported to you in my last letter No. 9 of 1st December, have given me some hope that I shall be able to discover the situation of Aornos, for which purpose I am now about to proceed towards the Indus. As however the Yusafzai country is at the present time unsafe for a traveller, I must be content with such information as can be procured from the people in the neighbourhood. From the Indus I shall proceed to the Doâb, between the Chenâb and Râvi, to inspect the ruins of a place called Sangala, which may possibly be the Sangala of Alexander's historians, after which I shall continue my march viâ Lahore to the British territory.

5. For the construction of a Map of the countries which I have visited, and for the preparation of a detailed report upon all the points which have been the objects of my research, I shall require the uninterrupted leisure of three or four months or perhaps even a longer time, and if Chinese Commissioners are expected on the frontier at the beginning of the next season, my Map will be ready for the use of the British Commissioners by the beginning of June. I trust therefore, that there will be no objection to my residing at Simla during the time that I am engaged upon the Map and report. Any other place would no doubt answer equally well for the construction of the map ; but for the proper preparation of the antiquarian and archeological portion of a report, such as I wish to make to Government, I must have access to my own Library, which is now lying partly at Simla and partly at Kal-

ka. I have also rented a house at Simla; my residence at any other place would therefore only be an extra expense to me without the advantage of access to my Library. At Simla I shall likewise be able to communicate with Colonel Boileau, upon whose judgment and assistance I must depend for the reduction and arrangement of the various magnetic and meteorological observations, which I have made during my present journey. Under these circumstances I trust to the favor of Government that I may be permitted to reside at Simla, for the preparation of my map and report.

I have, &c.

(Signed) ALEX. CUNNINGHAM,

Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Hazroo, 18th December, 1847.

*From Capt. A. CUNNINGHAM, Senior Commissioner, Tibetan Frontier,
To JOHN LAWRENCE, Esq. Resident, Lahore.*

Dated Camp Shumsabad, Huzdra, 7th January, 1848.

SIR,—I have the honor to forward to you a Report and Diary of Dr. Thomson's proceedings from the 20th of October, up to the 1st of December, 1847. The letter is dated Camp Iskardo, 1st December, and as Dr. Thomson proposed leaving Iskardo for Kashmir on the following day, he must now be most probably in Kashmir, or perhaps on his way towards Hazara.

2. I am happy to state that the sketch map alluded to by Dr. Thomson, supplies in a satisfactory manner the long desiderated survey of the Shayuk or Nubra river, from the foot of Nubra downwards to its junction with the Indus. With Lieut. Ralph Young's survey of the middle Indus in the Iskardo and Gilgit territories, and Lieut. Strachey's, and my own survey of the Upper Indus in Ladak, the Government will now possess a complete survey of the Indus and of its tributaries, from Haulé to Gilgit.

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) ALEX. CUNNINGHAM,

Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Shumsabad, 7th January, 1848.

From Assistant Surgeon THOMAS THOMSON, Commissioner, Tibetan Frontier,

To Capt. A. CUNNINGHAM, Senior Commissioner.

Dated Camp Iskardo, 1st December, 1847.

SIR,—I have the honor to forward for your information a diary of my route from the 20th of October, and a rough sketch of survey of Shayuk and Indus rivers from Nubra to this place, which however having been reduced in a very rude manner, can by no means be considered as representing accurately the course of the river.

2. I have been detained at Iskardo much longer than I wished, being in uncertainty regarding my future movements. My intention had been after a few days' halt to proceed towards Gilgit—but from all the information I can collect here regarding that country, it does not seem to me to be in a state fit for scientific investigation. Mr. Agnew, having proceeded to Cashmere shortly before my arrival here, I have not of course any very authentic information on the subject, but on the whole I have judged it best to proceed to Cashmere, for which place I propose to start to-morrow morning.

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) THOMAS THOMSON,

Commissioner, Tibetan Frontier.

Camp Iskardo, 1st December, 1847.

From Capt. A. CUNNINGHAM, Senior Commissioner, Tibetan Frontier,

To JOHN LAWRENCE, Esq. Resident, Lahore.

Dated Camp Illosan Abdal, 10th January, 1848.

SIR,—I have the honor to report to you, that I reached Illosan Abdal this day, after two visits to the Yusufzai country in search of Aornus, which I believe that I have discovered beyond all reasonable doubt, in the vast hill-fortress of Rani-gat or Rani-garh, situated immediately above the small village of Nogram, about 16 miles north by west from Ohind, and somewhat less in a direct line from the nearest point on the western bank of the Indus. Rani-gat is, I suspect, only a corruption of Rani-garh, the former name being a Pashtu term for the “Rani’s-

stone," a huge isolated block of granite on the top of the hill about 50 feet in height, on which a Rani of former times is said to have seated herself daily.

2. Rani-gat corresponds in all essential particulars with the descriptions of Aornus as given by Arrian, Strabo, and Diodorus, excepting in its elevation, the height of Rani-gat above the plain not being more than 1000 feet; which is however a very great elevation for so large a fortress. But as the breadths of all the rivers of the Punjab recorded by Arrian are at least four times too much, I do not think that the difference of height is of much importance; more particularly as we know that Arrian's height must have been greatly exaggerated, otherwise Aornus would have been covered with snow at the time of Alexander's siege, a fact which is not mentioned by a single ancient author. Mr. Williams, the latest historian of Alexander, estimates Arrian's 20 stadia at three quarters of a mile, which is about the slant height of Rani-gat.

3. The points of agreement between the two places are the following:—Rani-gat is an isolated inaccessible hill, with only one road cut in the rock leading to the top, although there are certainly two, if not more, rather difficult pathways, which indeed was the case with Aornus. It has also a detached peak as high as the place itself; and the intervening hollow from 50 to 150 feet in depth, corresponds to the ravine across which Alexander built his rampart. It was supplied with water by three wells cut in the rock, and by a tank in the ravine enclosed between two dykes, from which the constant permeation would have formed a small rill, similar to the trickling streams which now percolate from the tanks of Kaliujar and Gwalior. Lastly, its situation answers admirably to all the data, which have been handed down to us regarding Aornus. It stands between the Swat river and the Indus, and not far from the latter stream. To the north-west, about 20 miles distant, are the large and important villages of Bazar and Rustam, adjoining each other, and which now form the entrepôt of all the trade between the Swat valley and the Yusufzai plain. This entrepôt is, I have little doubt, the Bazaria of Alexander's historians, which submitted to him on his march eastwards, after the conquest of the Swat valley. As the Bazarians at his approach abandoned their city and took refuge in Aornus, the relative positions of Bazar and Rani-gat suit exactly all the conditions required for the ancient localities.

4. Regarding the antiquity of Rani-gat, which is the only point now wanting to complete the proof of identity of the two places, I cannot speak so positively ; but some valuable light has been thrown upon this subject, by two pieces of sculpture which I luckily found amongst many Buddhist fragments in the ruined citadel. These are the naked body of a man with the Macedonian chlamys, or short cloak, thrown over the shoulders and fastened in front, and a human breast adorned with a necklace of which the clasps are formed of two centaurs, boldly designed and gracefully executed. As these sculptures undoubtedly owe their origin to the influence of Grecian art, they show that the antiquity of Rani-gat certainly reaches as high a date as the second century before Christ, at which time the successors of Alexander, who ruled over the Kabul valley, still preserved some of the arts and arms of Greece. A higher antiquity of two or three hundred years, or even more, may therefore safely be granted to the massive granite walls of this Cyclopean mountain fortress, which must always have been the strongest and largest fortified place in the country. Even now the natives draw a distinction between it and other ruins ; for they call Rani-gat a *Killah*, or fortress ; whilst all others are designated *garhis*, or forts. If Rani-gat was not the Aornos of Alexander, it was certainly the Aornos of the times in which it flourished.

5. I have also secured some very perfect specimens of Buddhist sculpture, including a full length figure of Maya, the mother of Buddha, from the ruins of a small hill-fort near Jumal-garhi, about 28 miles to the westward of the Indus. But the most valuable acquisition which I have made has been the discovery of two short Ariano-Pali inscriptions in the same character, as that which is found upon the reverses of the Indo-Grecian coins. As both of these inscriptions bear dates, and as they are the oldest dated inscriptions hitherto found in India, I consider that the possession of them will be very cheaply purchased at the hire of a single camel for their carriage. I am therefore now bringing them, as well as the sculptures, along with me towards Lahore, from whence I will forward them to Government through the Ordnance Commissariat Officer at that station. The more ancient of the two inscriptions is dated in " Samvat 37, or the first day of the bright half of the month of Sravand, in the reign of Mahadaya, king of the Gushang (tribe)." The other inscription is dated in Samvat 333. The Gushang

were the most powerful tribe of the Tochari ; who, about the beginning of our era, overran both Persia and India. As I was the first to read their name upon the Indo-Scythian coins, I feel much satisfaction at finding my reading so fully confirmed by the discovery of this inscription.

6. I am now prosecuting my researches for the identification of the ancient Taxila, which was for many centuries, the chief city between the Indus and Jehlam ; after which I shall continue my route towards the British Territory via Lahore.

7. As in my letter No. 10 of the 18th ultimo, I mentioned on native authority that owing to the unsettled state of the Yusafzai country, I should probably be obliged to confine my inquiries to such information as could be procured from the people in the neighbourhood, I have now much satisfaction in stating, from personal experience, that, during my two visits to the Yusafzai district, I found the people happy and contented, and the chiefs highly satisfied with the arrangements which had been made for the settlement of their country by the British Authorities at Peshawar. My researches extended as far north as Char-golai, within 4 miles of the Buner frontier. In a few years hence I have little doubt, that the Yusufzai plain will regain its former prosperity, and exhibit once more the same smiling sheet of rich cultivation, which it must have shown under the settled administration of the first Mogul Sovereigns of India. The traces of large villages are numerous over the whole plain.

8. Herewith I transmit a copy of the Diary of my marches from the 18th of December up to the present date.

I have, &c.

(Signed) ALEX. CUNNINGHAM,
Bt. Capt. Commissioner, Tibetan Frontier.

Camp Hosan Abdul, 10th January, 1848.

[FEB.

Diary of a route of Assistant Surgeon THOMAS THOMSON, Commissioner, Tibetan Frontier, from 21st October to 30th November, 1847.

Camp Iskardo, 30th November, 1847.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
1847 21st Oct	Lyakjung.	9	Crossed Nubra valley to Taghur (halting place of 16th and 17th) and thence to near junction with Shayuk river.
22nd	Hundar.	9½	Over gravelly bed of Shayuk which is divided into several branches. Fорded it half way without difficulty. Hundar a large village.
23rd	Tertse.	10	Along south bank of river commencement of march through cultivation and villages, remainder very barren and stony.
24th	Unmaru.	5½	Much delay in crossing river at commencement of march. It was divided into numerous branches, three of which were deep ($2\frac{1}{2}$ to 3 feet in places generally above 2). Afterwards along N. bank generally barren. Camp at a large village.
25th	Karu (Camp).	9½	Along N. bank of river through barren stony country. The mountains gradually approach river and at end of March leave only room for stream to pass. No village.
26th	Waris (Camp).		Leave bank of river which is impracticable, to ascend a small valley descending from the north. Its banks were exceedingly barren and precipitous, and the road consequently difficult. A few links, only used for summer residence, and some fields round camp. Snow fell during the afternoon.
27th	Boghdan (Camp).		Crossed a high mountain ridge separating the Waris stream from that of Boghdan, and encamped on the latter at a place where there is a good deal of cultivation, but which is only inhabited in summer.
28th	Chulungka.	9	Descended Boghdan stream to its junction with the Shayuk, which I found

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
29th Oct.	urtuk.		with bold rocky banks as when I left it at Karu. At intervals however there are gravelly reaches on one side or other; valley continued narrow all the way to camp. Chulungka is a very small village, almost all its cultivable ground having been carried away by the great flood 5 years ago.
30th ..	ránu.		Generally along stony bed of river; occasional rocky ascents to get over otherwise impassable places. Crossed river by good wooden bridge close to Turuk, a large and extensive village.
31st ..	Siksa.		A great part of march over steep rocky hills, exceedingly barren. Crossed river at end of march by wooden bridge. Pránu a very extensive village.
1st Nov.	Kábás.		Also a rocky march in many parts; mountains still continuing on both sides very close to stream, so that its banks are not always passable. Crossed to left bank of river by wooden bridge near Siksa.
2nd ..	Surmu.	12	Along left bank of river. Road as for the last four days.
3rd	Kháplu.		Road more level, over gravel and boulders, or elevated alluvial banks. Crossed river by bridge at commencement of march and recrossed by a very deep ford at about a mile from end. In latter half of March valley widens, and near Surmu has spread out into a very wide alluvial plain through which the river winds in many streams. A large river joins from the north opposite Surmu.
4th	Halt.		The banks of the river being impracticable from bold projecting rocks road ascends a ravine, crosses a low ridge and descends upon Kháplu which is a very extensive town or village, with much cultivation and great numbers of trees.

<i>Date.</i>	<i>Halt</i> ing <i>place.</i>	<i>No. of</i> <i>miles.</i>	<i>Remarks.</i>
5th Nov.	Karku.	10	Crossed river below Khaplu. Road along bed of river or through cultivation the whole way.
6th	.. Braghar.	4	Along the right bank of the river almost the whole way. At end of march a large stream joins from the north.
7th	Kunes.	6½	The valley contracts below Braghar, and about two miles lower down, where it bends to the north, has become very narrow and rocky, so that the latter part of the march was a succession of ascents and descents.
8th	.. Kuru.		A fatiguing march over a ridge of mountains to avoid an impassable bed of the river. Road very steep and stony.
9th	.. Keris.		First two miles over rocks, remainder along river bed till reaching the cultivated lands of Keris, an extensive village.
10th	.. Golochu.		Junction of Indus is about a mile below Keris; afterwards the valley is very narrow and rocky, and the stream very rapid.
11th	..	9½	Road over rocks, but close to river for three miles, after which it ascends a lateral ravine and continues among low hills at some distance from the river, which is not seen again till end of march.
12th	Iskardo.		Over a sandy plain, crossing river one mile above Iskardo. Valley widens much and is very sandy. A large river joins from the northward.
13th till	Halt.		
31st.			

(Signed) THOMAS THOMSON,
Commissioner, Tibetan Frontier.

(True Copies)

J. LAWRENCE,
Officiating Resident.

*Diary of the Tibetan Commission, from the 29th of August 1847, to
10th January, 1848.*

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
1847. 29th Aug.	'o Khyuri.		Crossed the British frontier from Chang Razing into the Chinese territory. Commenced a regular series of observations with the barometer, the dry and wet bulb thermometers, and the solar and terrestrial radiation thermometers.
30th	Huling.	9 $\frac{1}{2}$	A mere halting place on the left bank of the Piti river. Crossed the Gyu river, which forms the boundary between the Chinese district of Chumurti and the British district of Piti.
31st	Lari.	7 $\frac{1}{2}$	The first village is Piti. Road generally over shingly landslips.
1st Sept.	Pôg.	8 $\frac{3}{4}$	On leaving Lâri passed at 2 $\frac{3}{4}$ miles the desolate, wintry-looking village of Tabo. From this the country was barren the whole way to Pôg.
2nd	Dankhar.	9 $\frac{1}{2}$	Not a single village occurred the whole way between Pôg and Dankhar. On the opposite side of the Piti river however, there was the village of Mání, the largest in the Pîi district.
3rd	.. Lâri.	8 $\frac{6}{7}$	At 3 miles crossed the Lingti, a considerable stream about 25 miles in length. At 7 miles passed the small village of Lidang. Dip of the magnetic needle at Lâra 43° 37'.
4th	Halting place opposite Rangrik.	8 $\frac{1}{2}$	At 5 miles passed the village of Karj. At 7 $\frac{1}{2}$ miles the bed of the river which, from Dankhar upwards had continued wide, open and level, was contracted to about 60 feet, between two rocks, where a wooden bridge was thrown across, a mile and a half below the large village of Rangrik, the Rerik of Trebeck and Broome.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
5th Sept.	Gyihbar.	6 $\frac{1}{2}$	At 4 miles passed the village of Kyi, with a picturesque looking monastery seated on a rocky eminence. From this point the road left the Piti river and turned to the northward of the Le-chu to Gyihbar, the last village in Piti.— Height above the sea 14,000 feet.
6th ..	Jukhtá.	6 $\frac{3}{8}$	A halting ground in the bed of the Le-chu, a narrow gorge 15,000 ft. above the sea. The wild leek was plentiful on this march.
7th ..	Bongrochan	2 $\frac{1}{2}$	An encamping ground, 17,000 feet above the sea. Here I suffered from headache and sleeplessness. The Sangram vuzeer, as well as numbers of the coolies and servants, likewise complained of headache.
8th ..	Pratang Kongma.	7	Crossed the Parang Pass, 18,600 ft. high. No snow on south side. To the north the road laid over a snow-bed for 1 $\frac{1}{2}$ mile, then rough and stony to camp. A magnificent glacier filled the ravine as far down as 2 $\frac{1}{2}$ miles from the top of the Pass.
9th ..	Halting place.	11	Road along the bed of the Parang river, level but stony. Snow-pheasants numerous.
10th ..	Núrbú Sumdo.	11	Road along right bank of Parang river, level and stony. At this point we were about 7 miles to the south of the Great Chomorin lake.
11th ..	Dunyar.	9	Road along right bank of Parang river. Saw two Kiangs, or wild horses, on the opposite bank.
12th ..	Dongan.	9 $\frac{1}{4}$	Crossed the Parang river and proceeded to the north-east, up the dry bed of a former lake of some extent.
13th ..	Gurkhyam.	10 $\frac{3}{8}$	N. B.—Lieut. Strachey here parted from us and continued his course down the Parang river to Chumur. A gradual but long and very fatiguing ascent for 5 miles, to top of Sânak Pass, 18,200 feet above the sea. In crossing

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
14th Sept. Hánlé.		15	this Pass I felt no headache whatever, but others complained of headache, which was no doubt occasioned by the elevation alone. Road from top of Pass exceedingly rough and stony for five and half miles to camp, in the bed of the Gurkhyam rivulet.
17th .. Mâng kang.		10 $\frac{1}{2}$	Road for $4\frac{1}{2}$ miles down the bed of the Gurkhyam, thence over gently undulating ground for 6 miles, then a steep descent of 500 feet to the Hánlé swamp, round which the road wound for $4\frac{1}{2}$ miles to Hánlé—a picturesque looking fortified monastery, seated on the end of a rocky spur, and washed on two sides by the Hánlé river. This place has rather an imposing appearance, with its square and round towers defended by Machicoulis. The peaceful Lamas however, yielded to Zorâwar Singh in 1834, without firing a shot.
18th .. Tâmashap-chu.		16	Road level along the left bank of the Hánlé river—a few hares amongst the Dâma jungle, which here grows upwards of six feet in height.
19th .. Rânak.		10 $\frac{1}{2}$	Road for 9 miles along the left bank of the Hánlé river; then over a stony but easy low pass, and along a dry barren plain to the left bank of the Indus, which is here a sluggish swampy stream, abounding with wild fowl.
			Road along the left bank of the Indus occasionally very stony. Passed the villages of Mûd and Nyimo on the opposite bank. At this place we took a section of the river which was 240 feet broad, and 3 feet deep, with a current of only $2\frac{1}{2}$ miles an hour. It was fordable with ease, the bed being soft and clayey. The banks are flat and low, and are covered with a long coarse grass. We observed some fish in the river.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
20th Sept.	Káldang.	11½	Road for $7\frac{1}{2}$ miles along the left bank of the Indus, the latter part very rough and stony. The river in some places is not more than from 30 to 40 feet in width ; after passing the village of Máhé (on the opposite bank) the road turns to the westward up the Rulang-chu, a small clear stream overshadowed with tall tamarisk trees.
21st	Púga.	4½	Road for $2\frac{1}{2}$ miles the same as yesterday, through tamarisk trees up the Rulang-chu. It then crossed the stream, and proceeds over undulating stony ground to Púga, the site of the borax and sulphur mines. The borax is collected from the surface of the ground on both banks of the rivulet. The sulphur is dug out of the side of the hill on the northern bank. The bed of the stream is full of hot springs varying in temperature from 80° to 148° the boiling point of water being only 186° . The stream is full of fish. Its temperature is considerably higher than that of the air. At 8 A. M. when the air was only 32° ; the water was 62° . This may account for the size of the tamarisk trees on its banks, many of which are 15 and 16 feet in height.
22d ..	Ialt at Púga		Halted to observe the meteorological and magnetical instruments ; and to examine the sulphur and borax mines. Thermr. at 5 A. M. only 13° .
23rd ..	Ankhung.		Road up the Rulaug-chu, extremely stony.
24th ..	Thogji Cheums.	16	Road an easy ascent for $3\frac{1}{2}$ miles to the top of the Pulakonka Pass, where I connected this year's survey with that of last year. Then an easy descent for $12\frac{1}{2}$ miles to the northern bank of the salt Lake, called Chokhár by the Láhulis, and Thogji Chenms by the Tibetans.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
25th Sept.	Larsa.	16	Road round the northern end of the Lake, and thence through a gap by which the lake formerly had an exit, as is proved by the millions of shells still existing in the ancient lacustrine formations, at a level of at least 150 feet above that of the present lake. From this gap the road ascended the plain of Kyung to the foot of the Tunglung Pass.
26th	Giah.	14 $\frac{1}{2}$	Snow fell during the night, and we found the ascent of the Tunglung Pass, about 1500 feet, extremely fatiguing. The cold was intense, and the wind high : and the snow and sleet were very annoying. The descent was rough, steep and slippery for about 3 miles. Thence for the rest the road was down a gentle descent along the left bank of the Giah rivulet, passing at 13 miles the village of Rumchi.
27th	Halt at Giah.		We found it absolutely necessary to halt after the last three long marches which had prevented us from taking any observations.
28th	Miru.		Road good and broad along the left bank of the Giah rivulet. Rocks throughout this day's march of a hard compact greenish sandstone, alternating with a silicious greenish conglomerate, and standing in almost perpendicular dykes. The conglomerates, although extremely hard, are generally worn smooth. If they could be cut and polished they would form beautifully variegated slabs.
29th	Ukshi.	7 $\frac{1}{4}$	Road good down the Giah rivulet which was crossed four times by good bridges of poplar spars. Ukshi stands at the junction of the Giah rivulet with the Singhi-chu, or Indus.
30th	Marsila, or Marchalang.	8 $\frac{1}{2}$	Road along the left bank of the Indus. At Marsila there are large plantations of poplar trees.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
1st Oct.	Chachôt.	11	Road along the left bank of the Indus, first over the irrigated fields of Changá; then over barren stony ground to Thakna; and thence through the fields and straggling houses of Chachôt, to Gola-bágh, a garden and house belonging to the late Governor of Ladák.
2nd ..	Lé.	9 $\frac{1}{8}$	Road for 4 miles through the cultivated lands of Chachôt, thence for 1 mile stony to the bank of the Indus, which we crossed by two substantial bridges of poplar, the larger one being 80 feet in length, and 8 feet broad within the railings. From the bridge the road was alternately sandy and stony the whole way up an easy ascent to Lé.
3rd ..	Halt at Lé.	..	Observed the meteorological instruments hourly, and obtained meridian and equal altitudes of the sun.
4th ..	Ditto.	..	Observed the declination magnetometer hourly, and obtained meridian and equal altitudes of the sun.
5th ..	Ditto.	..	Ditto ditto.
6th ..	Ditto.	..	Observed the dipping needles, and Hansteen's intensity apparatus; and obtained meridian and equal altitudes of the sun.
7th ..	Ditto.	..	Cloudy, no observations. Light snow fell.
8th ..	Ditto.	..	Cloudy morning and snow until 9 o'clock; obtained meridian and equal altitudes of the sun and four observations of a Polaris.
9th ..	Ditto.	..	Obtained meridian and equal altitudes of the sun. The morning was cloudy with occasional breaks of sunshine. The beginning of the solar eclipse was therefore not obtained within half a minute; and its termination was completely obscured: but the time of its greatest phase was accurately observed. Hourly meteorological obser-

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
10th Oct.	Thárú.	11 $\frac{1}{4}$	vations were made during the morning : and during the eclipse the observations were made every quarter of an hour, to note the abstraction of heat.
11th	Bazgo.	1 $\frac{1}{4}$	At 1 $\frac{1}{2}$ mile from Lé reached the new fort on the plain built by Vazir Zorawar Singh. It is a square of 200 yards with round towers at the corners and in the middle of each curtain. The walls are built of huge sun-dried bricks ;—they are about 20 feet in height, and are loopholed all round. The fort is well supplied with water inside, as it stands on the left bank of the Lé rivulet. There are 4 good 3-pounder brass guns with serviceable carriages and 30 well dressed artillery men. At 1 mile beyond the fort, passed a gibbet with the skeleton of a Boti-man hanging from it. He was executed six years ago by the Governor for killing a bullock. At 4 miles passed the village of Pitak. Just above this village there is an immense mass of indurated clay in horizontal layers, an undoubted lacustrine formation. At 9 miles crossed the Phiang rivulet leaving the village and monastery of Phiang one mile to the north.
12th	Sáspúl.	1 $\frac{1}{4}$	Road over undulating stony ground for 3 miles ; then a rough and sandy descent of 1 mile down a dry ravine to the level cultivated lands of Nyimo, a large scattered village opposite the junction of the Zauskar river with the Indus. Thence for 3 miles over barren stony ground to the fields of Bazgo and then through the cultivation to the village.
			Road for 1 mile through the fields of Bazgo : thence over barren undulating ground interrupted by dry ravines for two miles. Then down a

<i>Date.</i>	<i>Halting No. of place.</i>	<i>Remarks.</i>
13th Oct. Hemistokpo	9 $\frac{5}{8}$	dry ravine and along the bank of the Lakiru rivulet to Sáspúl on the Indus, a pretty scattered village watered by two revulets.
14th Snurla.		Road along the right bank of the Indus for six miles barren and rocky to Urlétokpo, a small place of only 2 houses, opposite the village of Sgyéra, which has a considerable extent of cultivation. Thence the road continues along the right bank of the river, with some steepish ascents and descents for 3 $\frac{1}{2}$ miles to a level spot opposite a small patch of cultivation with a few houses called Hémis-tokpo.
15th Bridge over the Indus.	8 $\frac{7}{8}$	Road for 4 miles along the right bank of the Indus, level and occasionally very sandy. At this point the upper road via Hémis joins the lower road via Sáspúl, and at 1 $\frac{1}{2}$ mile beyond the large scattered village of Snurlá is reached. Here walnut trees were first observed, but of no great size : the fruit however was large and good. Chakors were numerous ; and the wild animal, half goat half deer, called Shá, abounded on the opposite hills. I procured a fine large male with some difficulty.
		Road continued along the right bank of the Indus. At 4 miles passed Balukhar, a ruined castle on a low isolated rock. At 3 miles farther reached the village of Kallach, the Khalets of Moorcroft, who calls it one of the largest places in Ladák. It has now only 19 inhabited houses : but I observed whole rows of roofless houses. Indeed I have observed the same at nearly every village in the Ladak territory from Giah to Lé, and from Lé to Molvil. At one mile beyond the village, crossed the Indus by a substantial

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
16th Oct.	Lama yurru		bridge 8 feet broad, 77 feet long, and 45 feet above the water. On the right bank there is a wall square bridge-head, built of sun-dried bricks, with a guard of 12 men.
17th ..	Heska.		Road for first half mile along the left bank of the Indus. It then turns to the southward up the right bank of a small stream, the Wanla chu, which at 2 miles was crossed by a sanga. The stream winds considerably, but its general direction is to the south. After crossing it twice more the road left the main stream, and proceeded up a narrow ravine which gradually opened out into a well-cultivated valley. I observed immense masses of a fine pale straw-colored clay in all positions from the bed of the river up to more than 1000 feet in height ; and resting on the slate which stands at a highly inclined angle of nearly 80° after observing these undoubted marks of a large lake having once existed in this spot, I was much interested on hearing the Lamas of the place ascribe the founding of their Monastery to one Naropa, a Lama of Brigung near Lhasa, who drained the Lama Yurru Lake many centuries ago by cutting through the opposing rocks. The tradition is curious, as it may perhaps show that this lake must have existed at a comparatively late period ; unless indeed we give the Lamas credit for rather nice observation and the consequent deduction.

Road for 5 miles an easy and gradual ascent to the top of the Pass called Photolá, 13,000 feet in height. Thence an easy descent of 4 miles to Heska ; on the right bank of a small stream and bluff rock, above the village, there is a deserted Lamaic monastery.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
18th Oct.	Charak.		Road good and generally level, with a few slight ascents and descents. Crossed the Kánji river five times by temporary bridges. At $5\frac{1}{2}$ miles passed Kherbo, and at 7 miles, Thakshé, both picturesque-looking places, situated on isolated cliffs. At 8 miles the road left the Kánji (which is said to join the Indus at Dah), and proceeded up a small stream to the westward; an easy ascent the whole way.
19th	Molvil.		An easy ascent of $1\frac{1}{2}$ mile to the top of the Namyika Pass, 12,600 feet high. Thence a rather rapid descent of nearly 4 miles to the bed of the Waka chū; and then along the right bank of the stream through fields for 2 miles to Molvil.
20th	Halt.		Observed the clinometer and the meteorological instruments hourly from 4 a. m. to 4 p. m. and the dipping needles at $4\frac{1}{2}$ p. m. taking 16 observations of each needle.
21st	.. Dok.	8 $\frac{3}{4}$	Road for 3 miles down the Waka river, through an open and cultivated country. It then crosses the Pugal river, and shortly afterwards the Waka, which narrows to a mere rocky torrent till within $1\frac{1}{2}$ mile of Dok where the cultivation again appears.
22nd	Kargyl.	11 $\frac{1}{2}$	At $5\frac{1}{2}$ miles passed Paskyum with a fort on a projecting spur on the left bank of the Waka river, and the town on both banks below more than half deserted, but the lands well cultivated. At half a mile further crossed the river, thence passing several villages and much cultivation for 3 miles, the road ascended to a level stony plain and continued to the N. W. dipping at every half mile about 50 feet or more, and then descended nearly 300 feet to the junction of the Waka with the Suru

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
23rd Oct.	Near Kherbu.	11 $\frac{3}{4}$	river. The latter is a considerable stream about four times as large as the Waka-chu. A road leads up its bed to Kishtwar. It was by this route that Zorâwar Singh first invaded Ladak.
24th	Jas-gund.	12 $\frac{7}{8}$	At $\frac{1}{4}$ mile crossed the Suru river by two small bridges and one large one. Just above the bridges, on the left bank of the stream, is a small loop-holed fort, 50 or 60 yards square, with round towers at the corners. It is well supplied with water. Below the bridge the Purik and Suru rivers unite. The road then continued for $2\frac{1}{2}$ miles to the junction of the Suru and Drâs rivers. From this point it turned to the westward up the right bank of the Drâs river, along which it continued for 9 miles to the encamping ground, a short distance beyond the junction of the Shingo and Drâs rivers.
25th ..	Drâs.	7 $\frac{5}{8}$	Road for 7 miles continued along the right bank of the Drâs river passing the villages of Kherbu and Shimsha. It then crossed the river by 2 bridges, one of 20 feet span over a rocky channel, and the other of 50 feet span over the main stream. Thence for $5\frac{1}{4}$ miles up the left bank of the river passing Chibr and Taskyum. Snow fell during the afternoon.
			Road nearly due west the whole way to the fort of Drâs, chiefly over alluvial soil, the deposit of former lakes. On a small piece of ground just after passing the hamlet of Styalbo, and within half a mile of the fort there are three upright stone pillars on the side of the road. The smallest of the three is undoubtedly a modern Sati stone with a modern inscription (in the Hill character) of which I have copies. The

Date.	Halting place.	No. of miles.
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Remarks.

- other two pillars, familiarly called *Choms*, or the "Women," are also Brahmanical and not Buddhistical, for the almost obliterated inscriptions are in Kashmirian Nâgari, and not in Tibetan characters. I took copies of these inscriptions also.
- 26th Oct. | Matén. 11 $\frac{1}{2}$ Road for $7\frac{3}{4}$ miles to the westward up the left bank of the river, to Pân Drâs, a Kashmirian corruption of Pu-râna Drâs, or old Drâs, to distinguish it from the new Drâs or Sikh Fort. Professor Wilson strangely supposes it to be Paien-i-Drâs or lower Drâs, although it is higher up the stream. Beyond Pân Drâs the road continued for $1\frac{1}{2}$ mile to the westward up the stream and then crossed to the right bank by ford, and turning to the S. S. W. after 3 miles reached Matén. Snow fell heavily all the afternoon, and continued throughout the night.
- 27th .. Bâl-thal 15 $\frac{1}{2}$ Road for 5 miles through snow up the right bank of the Diâs river; and thence across the stream and up a short steep ascent, and up the stream for 6 miles further to its source in the Waga-Sar; from which also issues, in the opposite direction, one of the sources of the Sindh river, which flows into Kashmir. This is properly speaking the Pass or dividing ridge between Ladak and Kashmir: but as the road afterwards ascends a spur of the hill beyond to a point somewhat higher than the level of the lake, the latter is considered to be the Pass, and is accordingly named so as the Seo-ji-la. From the Pass the road descends very steeply for rather more than 2 miles to a log-hut, at the junction of the Waga rivulet with the Kishen-Gunga, which is said to come from Amaranâth. This

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
28th Oct.	Sonamurg.	8 $\frac{1}{2}$	spot is called Bâl-thal, literally "Hill-foot"—snow fell half the day.
			Road down the right bank of the Sindh river a succession of slight ascents and descents occasionally through fine forest. At $6\frac{1}{2}$ miles crossed the Nila, a large stream. At $8\frac{1}{4}$ miles crossed the Sindh by a wooden spar bridge, 60 feet span, and encamped opposite Sonamurg, which has now only one inhabited house. Snow fell all day and night.
29th	Gagangir.		Road for $1\frac{1}{2}$ mile level through deep snow. At $\frac{1}{2}$ mile beyond crossed the Sindh by a spar bridge, 60 feet span. Thence for 5 miles up and down steep rocky ruts, full of snow and mud; a most fatiguing and disagreeable march, snow falling the whole way. Around Gagangir great numbers of walnut trees. Snow during the day.
30th ..	Surbarâ.	10 $\frac{1}{2}$	Road for 7 miles to the W. S. W. along the right bank of the Sindh, and through much cultivation to Gundasarsing, where I observed the first rice-fields: thence to the S. W. for upwards of 3 miles to Surbarâ, crossing the Sindh 1 mile above the village.
31st ..	Kangan.	9 $\frac{1}{2}$	At $1\frac{1}{4}$ mile crossed the river and continued along the right bank to the northward of west, passing the pretty village of Mârgund, to Kangan, a good-sized place with much cultivation.
1st Nov.	Gândar-bal.	9 $\frac{1}{2}$	Road for 4 miles to the north of west along the right bank of the Sindh: thence across the river by a bridge of 57 feet span, and up a steep bank to an elevated table-land along which the road turned to the S. W. past the large village of Nunar to Gandar-bal. From the top of the ascent the Huri-purbut and Takhti-Sulimân to the east and west of the capital were both visible.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
2nd Nov.	Srinagar, Capital of Kashmir.	9½	Road for* miles round the base of low hills and along the edge of rice fields. At Daran I noticed large masses of conglomerate resting on the rock. The road then ascended a level cultivated plain upwards of 100 feet above the rice-fields. At 5 miles near the village of Shur I was met by the Dewān Nihāll Chand and escorted to the city where I took up my quarters in Dilawar Khan's Garden. In the evening the Dewan waited upon me with a present from the Maharaja of 325 Hari Singhi rupees.
3rd			
4th			
5th			
6th			
7th	Halt.		On these days I observed the declination magnetometer and the dipping needle together with all the meteorological instruments. I also obtained four meridian altitudes and numerous equal altitudes of the sun. On the 5th I paid a visit of 2 hours to the Maharaja Golab Singh. He was particularly cordial in his manner, and he recounted to me all the leading events in the conquest of Ladāk and Balti and the invasion of the Lahāsan territory. He seemed particularly desirous to impress me with the belief that his last expedition was undertaken not only against his wishes, but in spite of his repeated orders to the contrary. On this occasion, I presented to the Maharaja, a box with a singing bird, and on my taking leave, His Highness waved a bag of 50 Hari Singhi rupees round my head. On the next day, the 6th, at the Maharaja's desire I dined in the Shergurhi, and spent 4 hours in conversation with His Highness. He was very communicative, and detailed to me the strength and disposition of his Military force, and showed me specimens of his mountain artillery, small

* Sic in MS.—Ems.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
8th Nov.	Pandretân.		pieces that can be carried either by men or by bullocks. They are called Shér-bachchas and Bágh-bachchas or Tiger-cubs and Leopard-cubs. I requested permission to visit the different ruined temples in Kashmir, which was readily granted ; and I then took leave of the Maharaja, who presented me with a large scarlet cloak lined with fine sheep skins.
9th ..	Avantipur.	11½	Having sent a small boat to the tank in which the temple of Pandretan is situated, I was able to make a plan and elevation of this building, by measurement. It was built by the minister of Nirjita Vermma, in A. D. 920-921.
10th ..	Bij Bihara.	10½	Road along the right bank of the Behat, and through the celebrated saffron-fields to Pampur ; thence over an elevated plain for four miles to Satapura (or Lalitadityapura), where the road again proceeds along the bank of the river as far as Avantipur. At this place I found four ruined temples, two of which were built by Avanti Vermma, and two by his minister. Two of them are now mere heaps of rubbish. I made a ground plan by measurement of one of the two other temples, and left money to pay for excavating a part of the earth that had silted up the columns of the peristyle of the fourth temple.
			Road for 7 miles up the right bank of the Behat, and thence across the river by ferry. There are no ruins about Bij Bihara worth visiting, and the only inscription has been almost defaced by the Musalmans. The present town is built on the debris of the former city ; for the lingam, called Ladhawwa, or Kishteswar, is now 15 feet below the level of the ground on which the surrounding houses stand.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
11th Nov.	Bhomaju.	7 $\frac{1}{8}$	From Bij Bihara, the direct road to the caves of Bhomaju crosses the Lidar, or Lambodari river by ford to the large village of Bhawan, beyond which, at one mile, are the caves. There are but two caves worth mentioning, of which one is a long narrow natural fissure, leading to two or three cavities, each about 20 ft. in diameter. The other cave is no doubt partly artificial. It contains a small temple without any image. I made a plan and elevation of this building by measurement with considerable care; as it appeared to me, from the simplicity of its style to be the oldest temple in Kashmir. The whole surface of the temple was literally swarming with bugs, which made the measurement an extremely unpleasant task.
12th ..	Marttand.		Road through the pretty village of Bhawan, from which a steep ascent leads to the celebrated temple of Marttand, situated at the upper end of the extensive Karewah or elevated plain of Matan or Martan, the Kashmirian corruption of Marttand, मार्त्तन्, one of the names of the sun.
13th ..	Halt.		I halted the next day for the purpose of completing the measurements and drawings of this fine specimen of Kashmirian architecture. I do not, however, attribute any great antiquity to it, for it appears to me almost certain that it must have been erected at a later period than the temples at Avantipur, the columns of which have plain cubic bases. I made a ground plan of this temple, an elevation of one of the porches, with the adjoining columns of the peristyle, and views of the interior and exterior.
14th ..	Bij Bihara.	10	I returned to Bij Bihara over the plain of Matan, which, instead of being desitute of trees, as described by Vigne and Hugel, has upwards of 500 trees

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
15th Nov.	Avantipur.	10 $\frac{1}{2}$	upon it, a single clump of more than 50 trees being within half a mile of the temple. At Bij Bihara I copied the mutilated inscription, and examined the Chakradhar hill, which has once been covered with buildings. Its north-western end has evidently been a fort, cut off from the main hill by a broad deep ditch, which still exists.
16th ..	Ratanpur.	10	At Avantipur I made a plan of the second existing temple, and an elevation of the peristyle from a perfect portion, from which the silt had been excavated during my absence by my direction and at my expense. This portion had evidently been silted up before the Musalman ascendancy in Kashmir, for the human headed birds which surmounted the capitals of the pilasters of the archways, are still perfect.
17th	Pândritân.	12	From Avantipur I crossed the Behat and proceeded over the extensive Karewah of No-naga, (an admirable spot for the measurement of a base line of survey,) which is a perfect level 5 miles in length, with an average breadth of from 1 to 2 miles. On the opposite side of the Karewah I stopped for half the day to make a plan and elevation of the almost perfect little temple of Payachh, after which I proceeded to Ratanpur.
			At 2 miles I reached Kakapur, on the left bank of the Behat, where I examined the remains of two Hindu temples. From thence I proceeded by water to Pampur, where I made measurements of the remains of a small temple, of which one column of the peristyle is still in beautiful preservation. I also copied the short Sanscrit inscription which I had myself discovered when I passed through the town on my way up the river. I then continued my route to Pândritân,

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
18th Nov.	Srinagar Capital of Kashmir.		where I completed my drawings of the temple, and made sketches of several gigantic columnar fragments, which I believe to have once formed a single column, 7 feet in diameter, and upwards of 50 feet in height.
19 to 23rd	Halt.		I ascended the Tahkt-i-Sulimān on my way to the city, and made a ground plan of the temple, and an elevation and section of the surrounding wall and doorway. This specimen is particularly valuable, as it is almost certain that the temple was built by Raja Jaloka, about 220 B. C. The surrounding wall is extremely simple in its design, and I think I shall be able to show that it is the earliest existing specimen of the Kashmīrian order, from which, by successive additions and improvements, the beautiful peristyle of Marttand was at length gradually evolved.
24th	Vichār-nāg.		On the 19th I set up the Declometer and the Meteorological instruments which were observed on the following days, as well as the Dipping-needle and Hansteen's Intensity Apparatus. On the 22d I was to have taken leave of the Maharaja, but as he was ill on that day, my visit was necessarily postponed until the 23d, on which day I paid a farewell visit of three hours to His Highness, and received from him a khelat of 13 pieces for myself, and a present of three pieces, with a letter for my brother, Capt. J. D. Cunningham.
			I made a short march this day that I might have leisure to inspect the buildings and ruins about the city. I first visited the tomb of Sultan Zein-al-Ābidin's mother, close to which is the surrounding wall of an old Hindu temple in good order. From the simplicity of its style, it is undoubtedly of great anti-

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
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quity, only inferior to the temple on the Takht-i-Sulimān. I next visited the Juma Masjid, to verify the corrections of my ground-plan, which makes the number of its pillars to be 402. I found my plan quite correct. Beyond the present city, amidst the ruins of the various Mo-hallahs of the No-shehra, or new city of former days, I found numerous columns and vestiges of Hindu temples attached to Muhammadan mosques and tombs. But the most interesting was that of a figure of Buddha, and three short rude inscriptions of a few letters, each in the *Tibetan* character. I can only account for the occurrence of Tibetan letters by supposing that there formerly existed on this spot a temple built by Raja Rincha-na, the Ladāki conqueror of Kashmir, just previous to the Muhammadan period.

25th Nov. Mānasabal. 13½

Road for $3\frac{1}{2}$ miles along the edge of the Kārewah of Pandachye; thence across a swamp for 3 miles, to the Sindh river, which I crossed by boat near the remains of a masonry bridge, of which 5 arches are still standing. Beyond this, for three miles, the road lay through low ground, occasionally swampy, to the village of Bhoosa, on the edge of the Kārewah, at the foot of the Ahathyung hill, thence round the south and east sides of the hill to the Mānasa-bal lake. In the afternoon I ascended the hill and picked up hundreds of univalve shells, all of one species. The highest point at which I could discover any shells was 6,188 ft. above the level of the sea, or upwards of 850 feet higher than the present level of the Jehlam, and 118 feet higher than the temple of Marttand, which stands on the upper end of the Kārewah of Matan, the highest alluvial land in the valley

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
26th Nov	Pathan.	10½	These two data will give a height of about 6,200 feet for the surface level of the original lake, or Sati-saras, which must therefore have been at least 900 ft. deep. I was unable to discover any specimens of these univalve shells in the present waters of Kashmir, but I procured specimens of three varieties of existing shells, two univalves and one bivalve, and I am happy to add that I found numerous old specimens of the bivalve in the alluvial formations of Avantipur, at least 200 feet above the present river. This fact proves that a fresh water lake, 200 feet in depth, formerly existed in Kashmir, the waters of which must have covered the whole of the valley excepting the Karéwahs, or elevated table-lands, which are themselves of alluvial formation.
27th	Sopur.	12	The road first crossed the Behat or Jehlam at Sim-bal, by a bridge of five arches, where the river was 340 ft. broad. It then proceeded by a devious course, skirting swampy ground the whole way to Pathan. At this place I made ground plans of the two existing temples, which are similar to those at Avantipur, but much inferior to them, both in size and in their ornamental details. They were both built by Sankara Vermma, who reigned from A. D. 883 to 901. The one was named Sankara-gaureswara, after himself, and the other Sugandheswara, after his Rânee, Sugandha.
28th	Baramula.	10	Heavy snow having fallen during the night, and there being no prospect of the weather clearing up, I made my way with much difficulty through deep snow to Sopur, on the river.

Snow continued falling the whole night, and I proceeded by water to Baramula, which received its name from the Var-

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
29th Nov.	Piran.	6½	ha-Ganga, a small tank, which still exists in the town.
30th ..	Gingal.	8½	As the snow still continued falling, and the winter appeared to have set in, I judged it best to leave Kashmir at once and proceed to Mozafarabad.
1st Dec.	Halt at Gurgal.		Road throughout extremely difficult owing to the depth of the snow.
2nd	Sultan Dakka.	11	Halted for want of coolies—snow fell the whole day and throughout the night.
3rd	Kathai.	12½	Road continued along the right bank of the river—rain again during the day.
4th	Baliasa.	6½	Road as before. Heavy rain throughout the whole day and night. A short march to allow time for my missing baggage to come up.
5th ..	Khânda.		Another short march part of my missing baggage reached me at this place. Rain during the day and throughout the night.
6th	Hetiah.	10½	Road better to-day and the valley of the Gehlam more open. Light rain during the day.
7th ..	Halt.		Halted for my missing baggage which did not arrive until late in the evening.
8th	Mozafarabad.	14½	Light rain again. Road generally level and through much cultivation.
9th	Halt.		Halted for coolies and for observations of the sun, although the day was very cloudy.
10th ..	Garhi.		Crossed a pass into the territory of Maharaja Dilip Singh. Rain fell again in the valley, and the hills were covered with snow as well as the Pass.
11th	Mansera.	15	Heavy rain throughout the day and during the whole night. Roads exceedingly slippery over a clayey soil.
12th	Halt.		Halted to make arrangements for fresh coolies. Heavy rain throughout the day until 5 p. m.

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
13th Dec	Nowashehra.	14	Road more level and open than before. At 6 miles passed an octagonal temple built on a square base with arched recesses on each side, showing it to be of a very late date certainly posterior to the Mahomedan conquests.
14th	Chamba.	14	Road extremely muddy and slippery for 3 miles; then down the bed of a stony Nullah and over level cultivated fields to Chamba. On the road I noticed several Hackeries, a sure sign of level country.
15th	Iaripoor.	12	Road good through an open and generally level country well irrigated. Received a present of 125 rupees from the Sirdar Chet Singh.
16th	Sultanpoor.	13	Road good down the left bank of the Haru river.
17th	Hazru.	18	Crossed the Haru at 3 miles, thence through ravines and low hills for 9 miles, and over the beautifully cultivated plain of Chach to Hazru.
19th	Halt.		
20th	Shamsabad.		
21st to 23rd	Halt.		
24th	Ohind.		During these days I was suffering from acute rheumatism, brought on by exposure during 16 days of snow and rain without a tent, on my way from Kashmir. Two of my servants were likewise so ill, that they could not be moved even from Hazrut to Shamsabad, a distance of only 6 miles.
25th	Nogram.	16	Crossed the Indus by a capital ferry to Ohind, one of the most ancient cities in this country. The sands of the river are washed for gold. The washers likewise find numerous old coins and trinkets.
			Road skirting the hills on the northern edge of the Yusufzai plain. I was surprized to find the whole country from Ohind to Hastnagar one vast plain, instead of a hilly tract as it is represented in all the maps, excepting only that of General Court. This plain has once been thickly populated: for the remains

<i>Date.</i>	<i>Hulting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
26th Dec.	Manci.		of large villages are numerous, and water is at no distance from the surface. So scanty however is the cultivation at present that the people import both wheat and rice from Swat, in exchange for which they give coarse sugar, and cotton and woollen cloths. In the afternoon, I ascended the hill to the Fort of Rani-gat which I believe to be the Aornos of Alexander.
27th ..	Shamsabad,	18	In the morning I again ascended Rani-gat and made several measurements, as well as a rough sketch of the Citadel.
28th ..	Halt.		I returned to Shamsabad to make inquiries from Lieut. Robinson of the Engineers about several places of which I had heard only confused accounts.
29th ..	Bazar.	10	Halted to make arrangements for another visit to the Yusufzai district.
30th ..	Ali Mahomed.	10	Crossed the Indus at an island by two ferries; the stream on the right bank running very strongly.
31st	Turu.	11	Proceeded to Lieut. Lumsden's camp near Akord, to ascertain what parts of the Yusufzai country were safe for travellers, and to learn from him whether there were any ruins or inscriptions worth visiting.
1848.	Chargolai.	13	Over an uncultivated plain, which has in former times been a luxuriant sheet of cultivation.
1st Jan.			Visited the Shahbag-garhi inscription, and passed into Chargolai to make inquiries about the Kashmuri-garh, a cave which is said to have its exit in Kashmir. I found it was not worth visiting.
2nd	Shahbag-garhi.		On these days I made a copy, with much difficulty, of the most legible portion of the great inscription. A proper copy can only be made by levelling the ground and building up platforms, and by whitewashing the surface of the rock,
3rd	Halt.		

<i>Date.</i>	<i>Halting place.</i>	<i>No. of miles.</i>	<i>Remarks.</i>
			to bring out the sunken letters. Such a work would occupy a long time; but it would well repay the labour. I copied the greater part in a standing position, on sloping ground.
4th Jan.	Lahor.	18	Over the Yusufzai plain, passing only one large village, named Yar Husen, and a small one, named Sudher.
5th	Shamsabad.	12	Crossed the Indus by the Ohind ferry.
6th to 8th			Halted to make arrangements about camels, guards, &c.
9th ..	Burham.	14	Country much broken by ravines, and almost wholly uncultivated.
10th ..	Hasan Abdal.	7	Road through broken ground. Around the town there are some fine level sheets of cultivation.

(Signed)

A. CUNNINGHAM, *Capt.**Commissioner, Tibetan Frontier.*

(True Copies)

J. LAWRENCE, *Officiating Resident.*

Short Survey of the countries between Bengal and China, showing the great commercial and political importance of the Burmese town of Bhamo, on the Upper Irawady, and the practicability of a direct trade overland between Calcutta and China.—By BARON OTTO DES GRANGES.

The direct distance between Calcutta and the Chinese frontier of Yunnan is about 540 miles, nearly the same as that from Calcutta to Agra. The road which we have to travel admits of three sub-divisions, part first falling in Bengal, between Calcutta and Silhet; part second in the independent states of Cachar and Manipur, and part third in the Burmese empire.

Part first, from Calcutta to Silhet, is known, and on the whole distance river communication is open at all seasons.

Part second, up the Barak river (in Silhet called the Surmah) through Cachar. This Cachar, with the capital of Khaspur, borders east to Silhet, and is governed by an independent Raja. The Barak river runs through it, and is navigable as far upwards as Kalanaga Ghat, but in the dry season only as far as Talayn, where rapids interrupt the passage. The ground rises gradually towards the east to the Khainbunda mountains, which separate Cachar from Munipur. These mountains consist of several, from north to south running chains in a breadth of 40 miles, which are not above 4,000 feet high, and over which a road has been made by the Government of Bengal. Their Eastern foot rests on the table-land of Munipur, which has an elevation of 2,500 feet above the sea, and which is on all sides surrounded by mountains. This territory belongs also to an independent Raja, residing at the principal town of the same name, who, however, like his neighbour of Khaspur, is placed under the inspection of a Company's Resident. Our road lies across this elevated plain towards its eastern boundary, which is a range of hills called by some geographers the Mirang mountains. Over these we have to cross, then to descend to the Kubo valley, and to the above-mentioned Ningthi river, on which we reach Monfoo, the first Burmese frontier town.

On our road from Calcutta we have found river communication for the greater part of a direct distance of 250 miles to Silhet, and still further on for 65 miles to Kalanaga Ghat. From this place to Monfoo are only 105 miles, and we have to cross the Khainbunda mountains in a breadth of 40 miles, on good roads, then to traverse the Munipur table-land 30 miles broad, on more level ground, and finally over the Mirang hills to Monfoo on the Ningthi river, 35 miles.

The people which we meet on this track east of Silhet differ from each other according to the nature of the country which they occupy. They are first, the inhabitants of the low country, the Cacharees; secondly, of the higher Munipur, and thirdly, of the hills surrounding that table-land. They are all quite different from the Bengalees, and belong to the same group of Eastern Asiatic races as the Thay and Shan, the Burmese and Siamese. The occupants of the mountains round Munipur are the Nagas or Kookees. They are a free, independent and very active people, who, poor and separated from all cultivated countries around, have remained unsubdued by more powerful neighbours. They

build their villages on the most inaccessible ridges and mountain tops are of great muscular strength and indefatigable mountaineers. As such they will prove the best carriers for the transport of goods across their mountains—the Bugarrees of the East.

Part third—from Monfoo, on the Ningthi river further east to the Irawady are 70 miles direct distance. Of this part of our road we possess no information, and no European traveller has visited this country. Yet from the configuration of the whole peninsula we can conclude that it is filled up with parallel mountain chains running from north to south, of no considerable elevation and opposing no great difficulties to our progress. On the Irawady, about Kutha Mio, under the 24th degree of north latitude we meet with the great Caravan route leading from Ava to Yun-nan, and we go up the navigable river as far as Bhanmo, from where the road to Yun-nan runs in the valley of the Bhanmo, Roving (river) a tributary to the Irawady. This Bhanmo is the most important town of Northern Burmah ; it is the emporium of its trade with China, and annually, twice, at the beginning, and at the end of the dry season, a Chinese caravan arrives here, selling all the goods here, whilst only few merchants proceed to Ava. This market has been frequented since the earliest centuries, and formerly even to a much greater extent, than now, since the comparatively recent invasions and conquests of the Mranmas or Burmese, have interrupted the trade. Marco Polo, the famous Venetian traveller, who as an envoy of the Mongol Kublai Khan, visited these countries at the end of the 13th century, is the first who gives us some information of this market, and of the road leading from here into Yun-nan. The commerce transacted here is still considerable, and consists principally in an exchange of the various produces of Yun-nan, and neighbouring provinces of China, for those of Burma, and the more northern countries of the Bhor Khamtees, the Mismis and Sing Phos, as far as Assam and Tibet. The articles of trade, as given by Crawfurd, are the following :—

1. Exports from China.—Copper, Auripigment, Mercury, Cinnabar, Alum, Tin, Lead, Silver, Gold, Chinaware, Pictures, Ironware, Carpets, Rhubarb, Tea, Raw-Silk, Velvets, Honey, Musk, Paper, Fans, &c. Raw Silk and Tea are the greatest items, the former to the amount of 27,000 bales.

2. Imports to China from Burma, are Cotton, upwards of 75,000

bales edible Birds-nests, Ivory, Horns, Precious Stones, and British manufactures.

The whole exchange is estimated by Crawfurd from half a million to £700,000 annually.

Looking on the map of this part of Asia, it will at once appear surprising that a direct intercourse should never have existed on our route between India and China, and that the trade which concentrates at Bhanmo, should not have extended to Calcutta across these countries, which, as we have seen, are in all parts accessible, and which offer even many facilities for the transport of goods, and only the fact that the political state of these countries has been always very unsettled, especially since the Burmese gained the ascendancy, accounts for it in some degree. Yet is the way which we have described the only one that leads from India to China, and which connects both countries just at the point of their nearest approach to each other : it is thus the only road on which possibly any direct intercourse between both countries ever can take place, since in all other directions they are separated by the highest mountains and far greater distances : and if we look upon a direct trade between India and China as an object of the highest commercial, as well as political importance, we will give due weight upon the following points, which appear to render it easily practicable.

1. That there is water communication for a direct distance of 250 miles from Calcutta to Silhet, and further on for 65 miles to Kalanaga Ghat.
2. That from this place to Munipur, a road is made, and that there exist no difficulties in crossing the remaining part of the country to Bhanmo.
3. That the extensive trade which is carried on at present at Bhanmo, offers a very favourable opportunity for opening commerce with the Chinese and to extend the same to Calcutta.
4. That the market place for this new trade would be at Silhet, consequently in our own territory.
5. That the land transport from Bhanmo to Silhet would devolve on the Chinese, and that we would only have to go to Silhet by water.

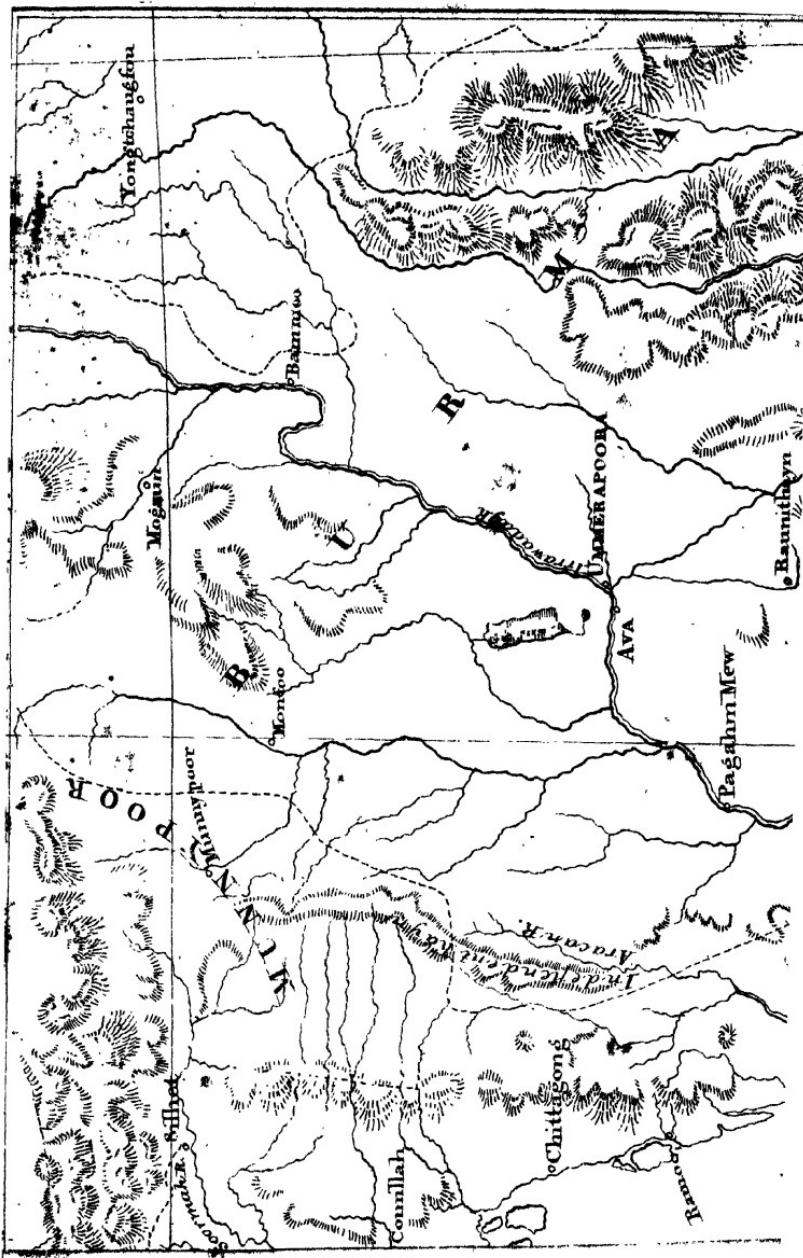
The spirit of enterprise of the Chinese is well known ; wherever they find security and profit there they resort to, and they will easily overcome the difficulties of the land transport between Bhanmo and Silhet, in

which perhaps any European would be less successful. On this probability that we need only go as far as Silhet, and that the Chinese will come there, so that Silhet would become the market place for the trade, rests the likelihood of success in any attempt to open a direct commerce between China and India, and every Calcutta merchant will enter more freely in this speculation, if he considers that the dépôt for his goods will be on British territory, and at a place to which he can transport the same securely by water and at little cost. What articles of trade would be the best suited for this commerce, and what profit could be realized, only experience and a better examination of the produces and requirements of these countries can show. Most likely that Opium and English woollen cloths would be in good demand in the interior of China, and that Tea, Raw Silk, but especially the minerals, as Silver, Gold, Auripigment, Copper, &c., of which Yun-nan is said to be very rich, will turn out as profitable purchases on our side.

But it is not to be expected that this commerce could be established at once, and that all the resources of the countries east of Bengal, and of interior China would flow at once into our channel of trade to be discharged at Silhet; on the contrary, we wish only to draw the attention of the Calcutta merchants and those connected with this place, upon these countries, to convince them, in showing how great a field for profitable enterprize still remains unexplored, that they deserve to be better examined, and that the advantages which they offer to commerce justify a first attempt to open the same. And this so much the more, as it could be done under a trifling expense, simply in this way, that (at least) two travellers, who are acquainted with the character of the natives and with the Burmese language, be sent to *Bhanmo* either by way of *Rangoon* and *Ara* up the Irawady, or by our route over *Silhet* and *Munipur*, for the following purposes:—

1. Of ascertaining the mercantile relations of the countries around *Bhanmo*.
2. Of entering the Chinese province of *Yun-nan* to examine its geological formations and mineral wealth.
3. Of entering into negotiations with the Chinese merchants at *Bhanmo* and to induce them to come over to *Silhet*.

There are no extraordinary difficulties in the attainment of these objects. The most difficult part would be to enter *Yun-nan*, which in case



it should be found impracticable, is not absolutely necessary for the ultimate success of the enterprise, as the Chinese caravan would be found at Bhanmoo. To go up the *Irawady* to *Ava*, has been always permitted to Europeans, and the time for doing this is favourable now, because the present Court of *Ava*, since the dethronement of *Tharawady*, appears to be more friendly towards us. At *Ava* it would be of the greatest advantage to secure the good will of the Chinese merchants there, since their jealousy would occasion the greatest difficulties, and because only under their protection it would be possible to enter *Yün-nan*. Besides the great object is to induce them to come over to *Silhet*, for they would soon calculate what profit a trade with *Calcutta* offers them; more would come the next year, and thus a regular caravan trade to *Silhet* might become established. For this purpose our travellers should be provided with a sufficient supply of articles for trade, the profit from the first sale of which might cover to some extent the expenses of the whole enterprise, which therefore would amount to nothing more than the remuneration due to our travellers, and this cannot be thought much, in comparison to the great and important object which may be obtained.

London, September, 1847.

A few observations on the probable results of a Scientific research after Metalliferous deposits in the Sub-Himalayan range around Darjeeling.—By R. H. IRVINE, Esq. M. D.

The whole of that portion of the Sub-Himalayan range amidst which Darjeeling is situated, as well as neighboring portions explored, exhibit the greatest similarity of aspect, the ridges being exceedingly steep, and rising from their bases at an acute angle; the main formation being primitive, the matter gneiss rock, displaced and disintegrated, and in most places not perpendicular, covered with a more or less deep deposit of alluvial soil, varying from a light yellow, to a stiff black loam, over which surface the main rock frequently crops out, and amidst which occasional deep beds of very stiff blue clay are found, such as underlies the London basin, and which so frequently appears at low water, amidst the sands on the coast of Kent. In the blue clay of this region, however, marine shells have not yet been discovered.

Though nearly the whole formation is gneiss, that rock is very seldom found horizontally stratified; indeed I never myself remember so seeing it: but has everywhere undergone displacement, as might have been expected, from the acute angle at which such lofty mountains rise.

A variety of minerals exist at scattered distances; but nowhere in such quantities, as to impugn the fact of the general character being gneiss rock. Besides iron ores, in rolled masses, of a silicious kind, which are not unfrequently found, I have heard of no metallic minerals having been as yet discovered. Graphite or black-lead ore, which is found very abundantly, is the only one of the least importance, that I have heard even alluded to.

The general gneiss formation is however of a highly metalliferous description; and the very same adjoining, and probably continued formation, is in Tibet, at higher elevations, known to be as far as explored, very productive in metals; while the yet unexplored is prodigious in comparison to that known at all.

At the foot of this portion of the Sub-Himalayan range, where the rivers pass out, there are few deep alluvial deposits; the rapid currents frequently carrying far below, and distributing over a vast space, all finer particles; the Balasun and Mahanuddee are the only rivers as yet well known at their exits from the hills; and no gold washing has ever been known to have occurred there; nor have any minerals of value been found, except carbonate of lime, in the shape of travertin, and tufa. Fine aluminous iron ore is however found amongst the Morung hills; and copper ores have also there been extracted, though the sites are now unknown.

With the exception of the absence of volcanoes, the Himalaya range, as far as known, consists in the main body of the very same mineral matter, as constitutes the chief nidus of all the valuable metallic ores found amidst the cordilleras of the Andes; the gneiss of the former only differing in an after process of nature from the granite and syenite, of the latter; while the Sub-Himalayas are covered with alluvial, and the Andes with green stone, and amygdaloid, basalt, and other trap formations.

It would seem not improbable, at the time that the quartz, felspar and mica forming the body of the Andes, were undergoing the cementing process in a semi-fluid state at a vast depth, and consequently

under enormous pressure ; when the most subtle gasses must have been liquids or even solids ; that the metals were reduced to oxides or sulphurets, from hitherto unknown matrices, and distributed in veins throughout the granular masses ; and thus when along with them upheaved by volcanic forces, portions were reduced to the metallic state, especially the gold, when again exposed to intense heat, under a pressure that permitted the gasses to escape.

It will be seen from the nature of the gneiss of the Himalaya range, in which Darjeeling is situated, that similar forces have been even more recently at work, and reasoning *a priori*, we may conclude that only want of proper exploration, has prevented the discovery of metalliferous veins.

It is clear that the most easy source of all gold deposits is alluvial ; a natural effect imperfectly imitated in obtaining the pure metal, from the solid granite ; and in all countries where gold is found, in alluviae, these are of course first exhausted before search is made in harder materials, through the original source. In that portion of the Himalayan hills however now spoken of, no gold or other metal can be expected to be found in the alluviae so generally covering them ; as that alluvia must have been deposited at a time when the gneiss forming their mass, was horizontally stratified, at a probable great depth, under superimposed fresh water, and when no great hills existed, from which metalliferous detritus could have come. In a similar way, even if gold does exist in the lower ranges, that metal will not be found in the alluviae of the minor rivers, owing to their rapid changes and sporadic distribution.

In the vast alluvial deposits containing gold in other countries, the torrents of the surrounding hills have for thousands of years, poured them down, while natural basins existed to retain them, and this forms one great difference of feature between the Himalayas, as yet known, and the Andes.

On the whole southern side of the Himalayas, as yet explored, no elevated plains are known to exist, while amidst the declivities of the Cordilleras, plains are often presented of immense altitude, completely level, and of vast extent, and which have retained the gold and other heavy deposits, washed down from the mountains.

On the northern and Thibet side of the Himalayas, similar vast plains occur ; and amidst these very thinly inhabited and hardly

known regions, very valuable deposits of metals have been found, and it is very certain that the identical rocks, in continuation from the detritus of which gold is extracted, in Thibet, form also the site of Darjeeling ; the whole being primitive, and chiefly of gneiss formation ; it has generally been found, that when alluvial deposits containing gold have been exhausted, all further search for that most valuable mineral amidst the hills from which the alluviae had been originally washed down, has been in vain ; and hence the conclusion usually come to, has been that deposits of gold, in metalliferous rocks, are extremely superficial ; and doubtless this conclusion is generally correct ; but not universally applicable ; as is proven by the depth of the Veta-Grand mines in Mexico, being 310 fathoms ; and in Potosi, where silver penetrates a hill 18 miles in circumference, to the greatest depth explored.

Though gneiss is the main formation of these hills, especially in the lower elevations, doubtless many other masses of transition rocks exist higher up.

Throughout the whole plain of India, from Bengal to the bottom of the deep wells in Jessulnere, and under the mica and hornblende schist of Ajmeer, the same kind of very hard fine-grained blue granite is found in solid and rolled masses ; and this granite must form the real basis, and underlies all the other strata of the Himalayan mountains. In all the mountains around Darjeeling, the gneiss is apparent ; but from the appearance through a telescope, the more elevated naked rocks seem to be solid granite and syenite.

The granite, gneiss, and mica slate of the Andes are generally covered by transition rocks, porphyry green stone, amygdaloid, basalt and other trap formations. In the province of Oaxaca granite and gneiss are rich in silver and gold ; and also in many other regions ; but neither granite, gneiss or syenite, are by any means the richest in metals ; on the contrary, throughout the Cordilleras of Mexico rich metallic veins are found in a great variety of rocks, and the deposits, which furnish almost all the silver imported from Vera Cruz, are primitive slate grey wacke, and Alpine limestone. The richest of all silver mines is in primitive clay slate, passing into talc slate. The silver mines of Potosi in Buenos Ayres are contained in primitive clay slate, and the richest of those in Peru, in Alpine limestone. Many of the richest metalliferous veins are found to traverse Alpine and Jura lime-

stone, and conglomerate throughout Mexico; where also graywacke is very rich in metals; the metalliferous rocks also abound in hornblende; and the porphyries are very rich in gold and silver. There is scarcely any variety of rock that has not been found to contain metals; and in South America especially, the richness of the veins, is for the most part totally independent of the nature of the beds they intersect.

In Potosi, the richest mines are at a vast elevation, the strata chiefly composed of a yellow, firm, argillaceous slate, with veins of ferruginous quartz, which constitute the matrix of the silver.

Reasoning from the above facts, it would appear that we must only expect to find veins of the precious metallic ores, at elevations very superior to Darjeeling, and that we must first discover and explore those regions, where transition rocks overlay the gneiss, granite, and syenite.

Doubtless the gneiss, at elevations equal to Darjeeling, and even less, also contains metallic veins, especially as the rock, from the abundance of hornblende, coincides in character with the Cordillera gneiss; but all the streams being destitute of gold deposits, prove that there are no superficial veins of that metal. By proper search lead, combined with silver, would very probably be found.

The total absence of Volcanoes does not militate against the hope of discovering metalliferous veins, as the Ural mountains, rich in metals, are as destitute of volcanoes, as the Himalayas.

The sub-stratum of the whole of the mountains around Darjeeling, must be considered of a primitive and metalliferous character, being chiefly hypogenic gneiss rock. I am convinced that abundant veins of copper, lead, and iron ores, will be found at low elevations; and that native gold, and sulphuret of silver, will be found in the higher regions, as throughout the elevated land of Thibet, gold is an abundant production, in the debris of rocks of similar stratification, forming the alluvia of the rivers, while oethiops-mineral or proto-sulphuret of mercury, is also there abundantly found.

The snowy range forms the barrier to each region, and the formation being integrally the same, it is far from probable that ores are only confined to the north-eastern aspect,—the probability being in fact, that the facility with which abundance of the precious ores are found in Thibet, solely arises from the face of the country, which is almost destitute of wood.

In Thibet, the soil is generally barren, and unimprovable, but the country abounds in mineral wealth. Gold has there been found in great quantities, and frequently very pure; occurring sometimes in large masses, but generally in irregular veins; it is also found in the beds of rivers, and often broken off, with every appearance of having been a large mass. Mercury, lead, copper, and iron also abound, as does rock salt. The great want of Thibet, is wood and coal to fuse the metals; while on the south-western aspect, fuel is superabundant; and were a good mule road only once established, through any pass in the Himalayan range, those native ores could be brought to Darjeeling, and there smelted to great profit.

In Russia and Siberia, up to a late period, only two gold mines were known in the government of Tobolsk. But since the discovery of the great deposits in the Ural mountains, the produce of gold and platina has become very great. The cold and mountainous regions of Siberia, are the great depositories of those vast stores of mineral wealth, by which the Russian empire is encircled; and the alluvial plains rich in gold and platina, are of considerable elevations; but the Ural mountains, the mines of which are the great modern sources of Russian riches, are in height and appearance not unsimilar to the hills around Darjeeling, varying from 3,000 to 7,000 feet above the level of the sea, and abounding in dark woods suited to the latitude, and in numerous streams, having a gloomy but not bare appearance. The Ural mountains, locked in by ridges, with the great Altaic range, divide Europe from Asia, for 1,500 miles; and almost wherever explored, have been found to be metalliferous. In other respects they also resemble the great Himalayan range; with which, through Tartary and little Thibet, by the great and little Altaic Ranges, they communicate, as it has been observed; that with trifling exceptions all the auriferous deposits have occurred in the eastern or Siberian side of the Ural. The body of these Siberian mountains appear to be granite, gneiss, and syenite; but overlaid, as in the Andes, by transition rocks; especially porphyry, jasper, and serpentine.

The most easy source of gold, is of course in a local detritus, such as form the chief origin of the Russian and Brazilian wealths; which detritus Sir R. J. Murchison describes as a shingle rather than sand; but on the south-western aspect of the Himalayan range as hitherto

known, we must search for the matrices of the precious metals, as there are no auriferous alluviae.

A very probable reason, why auriferous alluviae are not found amidst the Cis-Himalayan hills, is, that besides the absence of plains, to serve as dams to the streams, the whole surface of the mountains is covered with tangled close vegetation, that prevents the rains cutting away the soil and carrying much detritus down the streams.

In eastern Siberia, where the richest alluvial deposits exist, the surrounding low hills, from which they have been washed down, have been found to be composed, geologically, similar to the eastern flank of the Ural, so abounding in ores ; and it is most probable that most of the transition series overlaying primitive strata, throughout the great central Asiatic chain, will be found more or less metalliferous. Baron Humboldt pointed out that rocks similar to those so richly auriferous in the Ural, re-appear in various parallels of longitude, along the whole line of Altai.—Both in Siberia and South America, granite and gneiss alone, often contain rich veins of gold and silver ores.

Captain Newbold ascertained that auriferous veins and deposits exists at various points in Hindustan, extending from north to south.

Sir R. J. Murchison states that in the Ural, Siberia, as in Mexico and South America, green stone syenite and serpentine, appear invariably to have been the agents by which the metamorphic rocks have become auriferous, and that as the structure of the Taurus, and its spurs, of the Amanus, and Kurdistan mountains, is precisely similar, there is every reason to believe, that gold will be found scattered throughout western Asia ; and as similar rocks contain gold in Kamtschatka, they are therefore in all probability continued throughout all the great primitive ranges of Asia.

It has been well remarked that so far as regards our own material interests, the great augmentation of precious metals in Russia, should be met by increased activity of research on our parts, by qualified persons in Hindustan, as well as other British dependencies.

Should metallic ores ever be discovered at, or around Darjeeling, either in our own or any native state, a rapid increase of population would ensue ; and in working such mines, one great advantage would arise from the remarkable disintegration of the gneiss rock, which could

be blasted with great ease ; and also in the abundant supply of water, wood and charcoal.

The disintegrated nature of the gneiss of the Sub-Himalayan range, must have been produced by sudden exposure to currents of water or vapor, when under pressure at a vast depth, and when intensely hot previously to elevation above the level of the sea, and long previously to the deposit of fresh water alluvia, with which the whole mass is more or less covered.

The ridges at and around Darjeeling are very steep and narrow, and it would be well worthwhile to run a few narrow galleries through the hills at as an acute an angle as possible, to the dip of the strata, when ores of lead or copper would very probably be found.

And finally, with the view of ascertaining the existence of auriferous, or argentiferous deposits, I would urge the complete exploration of the mountains, at elevations from 7,000 to 13,000 feet, passing over the merely primitive strata, and carefully examining every yard of the transition rocks, wherever found superimposed.

A notice of a remarkable HOT WIND in the Zillah of Purneah.—Communicated by H. PIDDINGTON, Esq.

I heard in the early part of last year (1847) that a very singular hot blast had suddenly destroyed a large extent of Indigo cultivation in a factory belonging jointly to Messrs. Macintyre and Co. of Calcutta, and Mr. R. Cruise, the managing partner ; and on application to Messrs. Macintyre and Co. I was favoured with a sight of Mr. Cruise's letter, from which I made the following abridged extract, preserving carefully of course all that is essential to the subject, and excluding only mere matters of business.

(*Abridged letter from R. Cruise, Esq. to Messrs. Macintyre & Co.*)

DELOWRY FACTORY, May 28, 1847.

“What I am about to tell you will appear almost incredible. About 5 p. m. on the evening of the 25th there came a blast of wind from the west like the *Simoon of the desert*. It lasted only four or five minutes, but in that short time did immense mischief, it came right across the

heart of my finest and most forward cultivation, and the leaves of the indigo plant withered up before it just exactly as if they had been *fried in a frying pan* and the leaves are all fallen off. How far the plant itself is affected I cannot yet say. We have not had rain for some time, and without it I am afraid the loss will be very great indeed ; under any circumstances the manufacturing will be thrown back at least twenty days.

I believe neighbouring factories have all suffered more or less, but the principal fury of the heat was confined to a narrow slip of land in which was all my finest indigo, extending east and west about eight miles. The plant on either side of the slip escaped with comparatively little injury, and on the opposite side of the Ganges did not suffer at all. The wind was probably cooled by the river.

To crown all, the buildings and out-houses of two factories are blown down and some of the inasoury work necessary for the manufacturing process, such as the tables, &c. are broken and materially injured by the fall of the posts and roofs. In two factories there is not a house left standing.

The heat was so intense that in every village about here the villagers flew out of their houses from one end of the village to the other to look *for the fire*. In this factory also we all ran to an eminence to see where the fire was."

Your's very sincerely,
(Signed) R. CRUISE.

Upon this letter I drew up the following queries, of which also one or two copies were sent to Mr. Cruise, who circulated them to his neighbours, but I fear has received no replies to them, as none have reached me.

1. *What was the state of the weather, winds, clouds, and average heat of Thermometer (at about noon) during the day of the hot wind (the 25th of May) and the height of Barometer with you or any neighbour ?*

2. *What was the direction and force of the wind at the time of its occurrence ? and did it change ?*

A. As well as I recollect, before noon the day was clear, after noon cloudy and very hot ; all day I did not consult the thermometer.

A. From west to east. It did not change.

3. *What did the Thermometer rise to in the house or outside during the hot wind?*

4. *What was the appearance of the sky and clouds; was there any red or other coloured appearance about them?*

5. *Were delicate persons or animals affected while it lasted?*

6. *You state eight miles about east and west as the length of the mischief, but what was the breadth of this strip on an average, and of its broadest and narrowest parts in yards, and what the exact direction?*

7. *Was the wind the same way on the north and south sides of the track, or was it different, i. e. east on one side and west on the other, as with the common dust Whirlwinds? If differing, please to note as exactly as possible how it was on each side, and if any means exist, how it was in the middle. This may be determined by trifling things, such as branches of particular trees or shrubs carried forward or backward, &c.*

8. *Did the blast lift things at all?*

A. I did not myself observe, but am told between 98° and 100° in the house.

A. Very red and dark during the time that the hot blast lasted.

A. Some villages complained that they could not have endured the heat for any length of time.

A. The hot blast was not confined to a narrow strip, but extended from north to south at least 15 miles; that is, from the banks of the Ganges inland. The injury done to the strip of indigo plant was undoubtedly owing to the inflammable nature of the colouring matter in the indigo plant, and to a chemical combination and decomposition.

A. Same way.

A. It tore up a number of trees (some of them very large ones) by the roots and broke off bodily posts built into pucca work.

9. *Did it kill or hurt any animals, such as birds, snakes, &c.*
- A. Don't know.
10. *How was the wind in the damaged factories, and was this done by the hot wind or a common storm or squall? Please to get the best description you can of the destruction and especially if it was occasioned by the hot blast, and if this was considered as a whirlwind or a strait-blowing stream like a north-wester.*
- A. The damage done to the buildings was by the force of the wind. It did not appear to be a whirlwind, in fact by all accounts, it was not so, but a straight blowing stream.
11. *Was there any rain before, during or after the blast. The same of thunder and lightning?*
- A. A very few drops of rain fell just before we felt the heat. No thunder or lightning.
12. *What time may it have taken to travel from one extremity of the track to the other, i. e. at what rate per hour did it move on, by the best guess you can make?*
- A. I have no idea as to the rate of velocity. The storm lasted about 20 minutes—the hot blast was during about eight or ten minutes at the latter end of the storm.
13. *Can you obtain any sort of statement as to how it begun? Did it descend from above or how?*
- A. I have no idea. The first impression was that there was a fire, or that a large mass of the electric fluid must have fallen in the neighbourhood—but this was completely disproved by the extensive reach of the blast.
14. *Was it of full size at the beginning of the track?*
15. *Was the course wavy or a straight line, and did it appear to turn out of its way for any obstacles?*
- A. The hot blast did not appear to me to travel perfectly straight; some indigo fields were completely destroyed, some very little injured.
16. *Was there any perceptible smell with it of any kind?*
- A. I thought so, but no one else seems to have observed it. I thought there was a sulphureous smell.

17. *Is the ground torn up in any part of the track?* No reply given to this.
18. *Was the soil wet or very dry, or moderately moist?* A. Very dry.
19. *If it was the hot wind which did the mischief in the factories did it appear to affect metallic bodies and fastenings in any way?* A. No.
20. *If any things were lifted, how far were they carried?* No reply given.
21. *What is the position of your factory from the nearest station, and at what distance also from the Ganges?* A. Three factories on the north bank and one on the south bank of the Ganges varying in distance from the river from a mile to 3 miles, and all lying S. E. of the station of Purnea, which is distant about 36 or 40 miles.
22. *Is the line at the edges of the path of the blast very distinct or gradual and what is an average distance in feet or yards between the nearest fully burnt plant and that which is uninjured, and what is the state of the intermediate plants?* No reply given.
23. *If any good native accounts from villagers or Factory servants can be obtained, I shall be glad to have them in Bengali or in English.* A. Some of the carpenters in my employment have relations in the Morung engaged in the timber trade, who have lately returned home, and who say that fire fell from heaven in large masses, and that seven men were killed.

Mr. Cruise, in forwarding the replies to the queries, says :—

" In compliance with the request contained in yours of the 11th, I have had the pleasure of answering the questions proposed by you according to the best of my ability and recollection, and I herewith

return them. I am sorry I did not pay more particular attention to the phenomenon of the hot blast, which I noticed only as far as it was connected with my own business, and which otherwise I should not perhaps have observed. The other set of questions is in circulation among my friends in the neighbourhood, and I will return it in due time.

I would call your particular attention to the answer to the last question, viz. No 23 ;—I incline strongly to believe the report of the Morung carpenters, that fire fell from heaven. Their account is so exactly in accordance with scientific research that I cannot doubt the truth of it. They say that the seven men who were destroyed, became *like stones*, and that their friends could not take them up to perform the usual rites. They also say that the fire remained visible and hot for many hours after it fell in masses like large stones or blocks of coal."

And he inclines to believe that the bodies of the men may have been *vitrified*! as in the case of burnt stacks of straw and of Lot's wife ! but he forgets that, to this the objection is, that in the stacks the alkali and silex to form the glass are present in the material of the stack in large quantities, while human bodies would afford but a small portion of alkali, and this again in a way not likely to form any petrous mass by fusion with the earth of the bones. The fact however, of the appearance of a hot blast of great extent and violence at a high temperature, with the peculiar inflamed appearance of the atmosphere said to accompany the simoon, is of great interest, whether connected or not with the meteor said to have occasioned the death of the seven men in the Morung, probably at a considerable distance from Delowry. I have read somewhere, but I cannot now refer to the passage, of hot blasts being in some seasons experienced in Bundlecund, which often occasion death to those who are exposed to them. They are said to occur only in the height of the hot season, and the writer, I think, tries to account for them by some theory of excessive reverberation of heat in rocky defiles.

I trust that in future, members and residents in the country, who may be able to assist us in tracing these remarkable meteors, will not fail to do so : there seems to be something more than remote glimpses of a connection between intense electric action, such as this probably was, and the effects of whirlwinds and waterspouts. H. P.

On the Fall of Rain at Patna.—By C. E. RAVENSHAW, Esq. C. S.

I have the pleasure to enclose, for record in the Meteorological Department of the Society, an abstract of the quantity of rain which has fallen at Patna during the last $5\frac{1}{2}$ years. It may prove useful to some future Meteorologist who may be desirous of inquiring into the general distribution of rain throughout the extent of India, and of comparing the quantities which fall in different localities. Both the climate and vegetable productions of a country must very much depend upon the quantity of rain which annually waters its surface, and such data as that now afforded cannot, therefore, be altogether uninteresting in an agricultural and horticultural point of view. The observations have been made by myself with an English pluviometer placed near the ground, and I have every reason to believe that the result is a near approximation to the truth. It will be observed that the average of 5 whole years, including the rainy and dry seasons, is 36.65. I regret that I shall be unable to bring the observations down to the end of the present dry season, as I am about to leave India. The late rainy season was a very heavy one (43.48) and when the results of the whole year shall be added to those of the preceding 5 years, it is probable that the average of the whole 6 years will be about* 38.18. The average of 13 years in Calcutta is given in one of the Almanacs at 58 inches, and the average of 5 or 6 years at Delhi was stated in the papers sometime ago at 24. The average of Patna is therefore something less than the mean† between the two extremes of the Bengal Presidency. As the monsoon commences in the Bay of Bengal and travels westward, following generally the course of the Ganges towards

* 43.48 Rainy Season of 1847-48.
2.35 Average of 4 dry seasons.

45.83
183.24 Total of 5 whole years.

6)229.07

38.18 average of 6 years.

† Calcutta, 58
Delhi,.... 24

2.62

Patna,.... 38
41

Difference, 3

Simlah, this is about the proportion which it might be expected beforehand would fall to the lot of Patna and Delhi respectively. At Bombay the average of 25 years has been stated at 76, which is greatly in excess of that of Calcutta. This may be owing to the chain of mountains to the east of Bombay, which probably arrests a great portion of the clouds which would otherwise distribute themselves over the Dekhum. The average fall of rain in England is stated in an Encyclopaedia at 31, and that of the whole world at 34, so that Patna has no reason to complain of being stinted of its fair proportion of the fertilizing gift of Heaven.

Abstract of Rain at Patna for 5½ years.—(Lat. 25° 36'.)

1842-3|1843-4|1844-5|1845-6|1846-7|1847-8|Average.

Rainy Season.	May,		1.54	3.40	2.24	.. 84	1.66	
	June,	7.33	5.50	4.95	4.74	65.6	2.36	
	July,	14.06	3.05	9.00	9.34	104.2	13.16	
	August,	11.86	3.76	10.78	7.20	90.0	16.99	
	September,	10.11	3.38	4.26	7.69	9.12	5.37	
	October,	6.46	4.03			.. 85	1.00	
	Total,	49.82	21.26	32.39	31.21	36.79	43.48	35.82
Dry Season.	November,	0.00					1.39	
	December,	1.74				60		
	January,	11	.. 46	67	14	1.90		
	February,	23	1.53		75	.. 07		
	March,	10	.. 07	--	60	.. 05		
	April,	12	1.19	.		.. 64		
	Total,	2.30	3.25	1.47	2.09	2.66		2.35
<u>Grand Total of year..</u>		52.12	24.51	33.86	3330	39.4		36.65

On the great Diamond in the possession of the Nizam.—By HENRY PIDDINGTON, Curator Museum Economic Geology.

At the November meeting of the Asiatic Society Captain Fitzgerald, B. A. presented for the inspection of the Society a model in lead of this remarkable stone, and gave a brief note of its history, which will be found in my report for that month. He has since favoured me with a more detailed one, which is as follows.

Note by Captain Fitzgerald, Bengal Artillery, attached to the Nizam's Service, on the Nizam's Diamond—1st December. 1847.

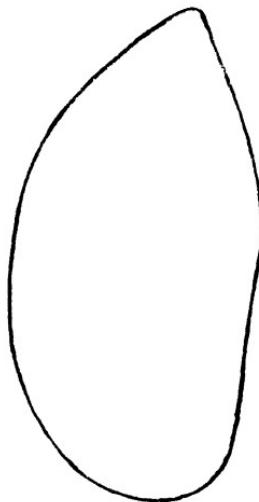
"About 12 or 14 years ago a large diamond was found in the Nizam's country under circumstances of rather a curious nature. The model

now shown is the model of a part only, a piece having been chipped off, which after passing through many hands, was purchased by a native Banker for 70,000 rupees.

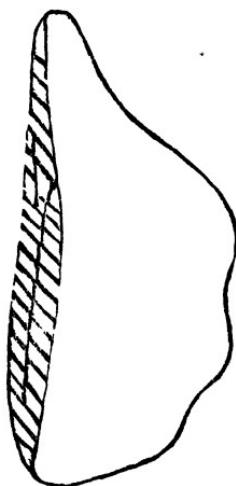
"The larger piece, as represented by the model, is in the possession of his highness the Nizam, and at the time of discovery was exhibited to many European gentlemen.

"The manner in which this Diamond was originally found, may be considered interesting. It was first seen in the hands of a native child, who was playing with it, of course ignorant of its value. On eight annas being offered for what the poor people considered as a mere stone, their suspicion was excited, which led ultimately to the discovery of the bright stone being a real diamond.

"Its form and size is shown below. This stone, hitherto unknown, may now be classed among the larger description of Diamonds which we read of, but seldom see."



Base.



Side view.

The size of the stone exactly taken by callipers, from the leaden model, is as follows :—

Length,	2.48. <i>Inches.</i>
Greatest breadth,.....	1.35.
Average thickness,	0.92.

I have had now exact models cast in glass from the leaden one exhibited at the meeting, and I find that

	<i>Grains.</i>
Their absolute weight is,	1164.50.
Their Specific Gravity,	3.70.

Now according to various authorities we have for the specific gravity of the Diamond

Ure,	3.53.
Brewster, colourless,	3.52.
orange,	3.55.
Jameson twelve authorities, mean,	3.52.
Mean,	* 3.52.

And hence assuming our model to be exact, (and it is very nearly so,) we have by a simple proportion not quite 1108 grains for the actual weight of the Nizam's diamond.

This is equal to 277 Carats of weight of the rough diamond, and as the rough stones are usually taken to give but one half of their weight when cut and polished, it would allow 138½ Carats, or a weight between the Pitt (or Regent) diamond (136¾ Carats), and that of the Grand Duke of Tuscany (139 Carats), for it in its present condition ; and if we take it that one-eighth of what it would be when polished was taken off with the splinter sold to the native, as related by Captain Fitzgerald, we shall then have 155½ Carats for the possible weight of it, if it had been cut and polished entire ; which would then place it as to weight between the Tuscan and the great Russian Diamond of 195 Carats, which last is well known to be an Indian stone.

We are not informed if this stone is considered as likely to be one of pure water, which can only be ascertained by polishing it, though we know that the natives of India, and particularly of the Deccan, are too good judges of diamonds to mistake a topaz for one, and it is stated that 70,000 Rs. have been paid for the fragment. It therefore certainly adds one extraordinary fact more to the history of this most wonderful of the gems."

MISCELLANEOUS.

Extract of a letter from Capt. J. D. CUNNINGHAH, Political Agent, Bhopál.

1.—*Lingam at Bhojpur.*

"I took a run round the other day to Bhojpúr, to look at the Lingam there again; for after answering a note of yours in the affirmative about the contemporaneousness (a long word) of the "Achintea deoj," I had some misgivings, and I am now satisfied that it is *not* original. This circumstance does not of course affect my argument, for whenever written, it was written by a Hindoo, and that is sufficient; that it is there, is indeed enough.

The letters are not so evenly cut as they would doubtless have been by the original architect; neither are they quite in the centre of the stone; and although we have the example of Roman inscriptions, even on coins, being straggling, I give this one up as contemporary.

If my former note misled any one besides yourself, pray give the necessary explanation."

2.—*Inscription at Singapore.*

In the sixth volume of the Journal, page 680, there is an interesting account of an ancient and much weatherworn inscription on a rock at the jetty of Singapore. A facsimile was prepared by Dr. Bland of H. M. S. *Wolf* and forwarded by him to James Prinsep, who pronounced the character to be Pali, and though unable to connect sentences, or even words, easily recognised many of the letters, and conjectured the inscription to record the extension of Buddhism to the Malayan promontory. On learning from Dr. Montgomerie that this rock had been blasted some years ago, I ventured to solicit the present Governor, the Hon. Col. Butterworth, C. B. to secure any legible fragments that might yet exist; and have since received his kind promise to forward such to the museum of the Society, where I trust the practised eyes of our antiquarians may yet decypher enough of the legend to determine its purport. Col. B. observes:—"The only remaining portion of the stone you mention, except what Col. Low may have, I found lying in the verandah of the Treasury at Singapore, where it was used as a seat by the Sepoys of the guard and persons in waiting to transact business.

I lost no time in sending it to my house, but, alas! not before the inscription was nearly erased. Such as the fragment was then however, i. e. in 1843, it is now; for I have preserved the stone with much care, and shall have much pleasure in sending it for your museum, having failed in establishing one, as I hoped to have done, in Singapore. I am happy in thus far meeting your wishes, and in assuring you that I shall always be ready to forward the views of the Asiatic Society."

3.—*Extract of a letter from Professor Henry, to Dr. O'SHAUGHNESSY.*

"I have for some time past been able to do but little in the way of science, my time, during the present year, has been completely absorbed in the organization of an Institution lately established in Washington, by the munificent request of the late James Smithson, of England. *

Smithson was the illegitimate son of the Duke of Northumberland, and in his day was considered a chemist of some merit. He was a frequent contributor to the transactions of the Royal Society and to the pages of the Philosophical Magazine. He died at Genoa in 1829, leaving all his property, in case of the death of his nephew, to the United States, to found at Washington (such are his words) an establishment under the name of the Smithsonian Institution for the *Increase and Diffusion* of knowledge among men. The money (500,000 dollars) came into the Treasury of the United States about 8 years ago, but Congress could not agree on any proposition for the organization of the Institution until last year, when an act was passed giving some general directions and placing the Institution under the care of a Board of Regents. This Board chose me the Secretary, or active executive officer, of the Institution; and they adopted, provisionally, the plan of organization of which you will find a programme in the package I send you.

I suppose you receive all the Journals and keep yourself posted up, in a knowledge of all the discoveries of science. One of the most wonderful additions to medicine is the effect of the inhalation of ether. I send you a pamphlet on the history of this discovery, made by an acquaintance of mine, Dr. Jackson of Boston. Some of the effects would appear to be similar to those of your extract of hemp.

Astronomy appears to be in the ascendant. I have just this minute received a note from Philadelphia, informing me that the second new asteroid, discovered by Hencke, has been seen in that city. The discovery of Le Verrier and Adams is a remarkable fact in the history of science, and the wonder, with reference to it, has been increased by the researches of Walker and Pierce, two American savants, who have proved that the planet Neptune is not the only body that occasions the perturbations of Uranus, but that there must be another, if not more planets, to produce the observed effects ; or in other words, they have proved that Neptune is not the hypothetical planet of Le Verrier and Adams, rendered visible by the glass of the German observer, but another body, the discovery of which was in a great degree accidental.

Have you looked at the researches of Matteucci on endosmon and on the electrical currents of the animal body ? They are highly interesting.

Mattenci has shown that during life there is constantly a current from the muscle to the blood, and thence to the fasica ; or in other words that the muscle is the zinc, the blood the acid, and the fascia the copper.

The electrical telegraph is in rapid progress of extension over our country, and will soon unite the most distant extremities of the *Union*.

On a late occasion the marking apparatus was worked through a distance of 900 miles of wire. This was effected, however, by means of a local battery, to operate the marking machine, and the circuit of which was closed by the slight motion of a small tongue of soft iron between the legs of a horse-shoe galvanic magnet, around which a part of the wire of the long circuit was coiled. Considerable difficulty has been experienced in the long reaches during wet weather in preserving the insulation ; the electricity escapes along the posts. I have suggested the propriety of distributing the batteries in parts along the whole length of the circuit in order to obviate this difficulty. A single battery is now placed at one end of the line, and consequently, the electricity must rise to considerable intensity to pass the whole distance. The resistance to the return current through the earth appears to be inappreciable ; the great amount of conducting matter reduces the resistances of the earth and moisture to an infinitesimal quantity, though under other circumstances they are found to be considerable. This is shown by the following experiment of my own. The long wire of the telegraph was broken at a convenient point, and the two ends of the

break, plunged, at the distance apart of about an inch, into a tumbler of water; though the electricity would readily pass through hundreds of miles of moist earth, not the least quantity appeared to be transmitted by the inch of water in this arrangement. The explanation does not appear to be difficult. In this case the quantity of conducting matter was not sufficient to allow of the lateral expansion of the electrical currents necessary to the diminution of the resistance of the water.

Another obstacle to the operation of the telegraph in this country is the indicative influence of every flash of lightning which takes place within many miles of the line of conductors. You have probably seen my report on this subject, made to the American Philosophical Society and republished in the *Philosophical Magazine* last winter. I regret that I have not been able as yet to find a copy to send you.*

You have perhaps seen an account of my researches on the spots of the sun by means of the thermo-electrical apparatus, and an image of the luminary in a dark chamber. I have since applied the thermo-pile to the eye-end of a large reflecting telescope, and the combination has given me an instrument of such delicacy that I can detect the heat of a man's face at the distance of several hundred yards. The smallest cloud will give a deflection of the needle of 30 degrees. I have intended to apply this arrangement to the exploration of the heavens for differences of temperature in the celestial vault; and a few observations I have made give some interesting results, but my engagements have been such that I have been unable to follow them up.

I think I informed you in a former communication that I had worked out fully, the cause of the phenomena of the lateral discharge; but I am ashamed to say that my paper in full on this subject has not yet been published. I have from time to time given the facts to the American Philosophical Society and they have appeared in the different numbers of the proceedings of this body. You will find some of my results mentioned in my report on the wires of the telegraph, a copy of which I have been so fortunate as to find, and which you will receive in the package I send you.

I have to regret that the articles I send you are not more worthy your acceptance; they are such as were on my table at the time I re-

* I have since found a copy, which I enclose in the package.

ceived the intelligence that my friend is to start to-morrow ; you will please to accept the package, and this rambling letter, with the assurance that I shall ever recollect with pleasure your short visit to Princeton and shall cherish the hope of again meeting with you before the termination of the journey of life."

4.—*Library, &c. at Jessulmere.*

Extract of a letter from A. SUTHERLAND, Esq. to H. M. ELLIOT, Esq.

" My visit to Jessulmere has been of a very satisfactory kind, as you will see presently. I wish that you or any one learned in Hindu or Buddhist antiquarian lore, were there. You know, I dare say, that the most valuable collection of books in India is believed to be in a Jain temple on the hill fort. The temple has never been desecrated, for the fort was never taken I believe, and the Buddhist form of worship is now the same as it was perhaps a thousand years since ; women principally ministering. There are a number of tablets, some of them in niches in the walls, others separate, covered with inscriptions in unknown characters ; not the arrow-headed, I think. I was disappointed in the extent of the library, which is in a vault of the temple ; the few books we saw, the others being in chests, were, some of them, writings on palm leaves, bound up between boards, such as we see in Ava and China ; the characters *readable* by the pundits ; but the language unknown ; the only dates readable on the tablets were only 300 or 400 years old, but most of them are of great antiquity. Some of the tablets are of a mystical character evidently, and of curious shield shapes. Tod drew much of the material for his history from the Jessulmere library, although he never was there I believe."

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR FEBRUARY, 1848.

THE usual monthly meeting was held on the evening of Wednesday, the 2d February, 1848.

J. W. COLVILE, Esq., President, in the chair.

The proceedings of the evening commenced by the Secretary's reading the following note from Mr. Colvile, acknowledging his election as President of the Asiatic Society.

To the Secretary of the Asiatic Society.

SIR,—I beg leave to acknowledge your letter of this day, in which you inform me that the Asiatic Society of Bengal have done me the high honor of electing me the President of the Society for the year 1848.

The assistance which I am sure I shall receive from you and the other officers of the Society will, I trust, enable me so to discharge the duties of the office that the Society may not have reason to repent of its choice.

I have the honor to be, Sir,

Your Obedient Servant,

Jan. 13th, 1848.

JAMES W. COLVILE.

The Council communicated the following letter from the President, announcing Lord Dalhousie's gracious acceptance of the office of "Patron" of the Society.

To the Secretary of the Asiatic Society.

MY DEAR SIR,—I have to inform you that this morning Mr. Bushby and I waited upon the Governor General by appointment, and that His Lordship was pleased to express his willingness to become Patron of the Asiatic Society of Bengal, and his readiness to further the interests of the Society by all means in his power.

I regret to state that Sir John Grant and Lord Arthur Hay were both prevented from accompanying Mr. Bushby and myself, the former by indisposition,

the latter by his departure for Madras, which took place on the day preceding that fixed by the Governor General for the reception of the deputation.

I take this opportunity of recording my opinion that the Council was guilty of an unfortunate oversight in the omission from the list of those who were to form the deputation, of the names of yourself and Mr. Laidlay. I think that on all similar occasions the gentlemen who fill the office of Secretary should be understood to be necessarily and as of course, included amongst the representatives of the Society, and this, both in justice to themselves, and because they are probably the persons best qualified to give such explanation as may be required of the constitution, objects, and working of the Society.

Very faithfully Your's,

Jan. 18th, 1848.

J. W. COLVILE.

The accounts and vouchers for January were submitted.

II. Alexander, Esq., C. S., duly proposed and seconded at the January meeting, was ballotted for and elected a member of the Society.

Read a note from Mr. W. Knighton, withdrawing his name from the list of members.

To the Secretaries of the Asiatic Society of Bengal.

GENTLEMEN,—Finding that I have at present no time to devote to literary pursuits unconnected with my duties, and not being likely to have any such for many months to come, I shall feel obliged by your removing my name from the list of members of the Bengal Asiatic Society from the commencement of the current year.

I am, Gentlemen,

Your Obedient Servant,

Calcutta, Jan. 11th, 1848.

W. KNIGHTON.

From II. M. Elliot, Esq., Secretary to Government, Foreign Department, transmitting a Journal and Map by Capt. A. Cunningham, illustrative of the boundary between the British territories and those of the Maharajah Golab Singh.

From II. M. Elliot, Esq., Secretary to Government, Foreign Department, presenting the MS. of a grammar of the Sindhi language, by Lieut. Stack. (Referred to Oriental Section.)

From Capt. Kittoe through Mr. Bushby, forwarding for inspection of the Society, Lieut. Maisey's copies of the Kalinger inscriptions, and drawings of the architectural antiquities of Kalinger and Nilkant, with MS. description by Lieut. Maisey, and transcripts in modern Nagree, by Capt. Kittoe—also returning the drawings, plates, &c., of the Cave

Temples of Mandah, which at Capt. Kittoe's own request had been lent him, for examination and for description in the Journal; having taken them with him to Benares, in July last, Capt. Kittoe, in reply to applications from the Secretaries, returns the drawings (date of receipt Jan. 27th,) and expresses his inability to spare time to copy and describe them.

Read the following letter from J. Thornton, Esq., Secretary to Government, N. W. Provinces, also referring to the Kallinger and Mandah drawings.

No. 107 of 1848.

From J. THORNTON, Esq. Secretary to Government, North Western Provinces.

To the Secretary to the Asiatic Society.

Dated Head Quarters, Jan. 26th, 1848.

SIR,—With reference to my letters to your predecessor dated May 19th, and December 19th, 1846, regarding drawings of the Kallinger and Mandah Cave Temples, I am directed by the Hon'ble the Lieut.-Governor of the N. W. P. to request that the drawings and papers transmitted with those letters may be made over to Mr. G. A. Bushby, the Secretary to the Government of India in the Home Department, if they are no longer required by the Society, in order that they may be transmitted to the Hon'ble the Court of Directors.

2d. I am further desired to inform you that a second series of drawings of the Kallinger Temples, executed in a very superior style by Lieutenant Maisey, 67th N. I., together with an explanatory memoir, and fac-similes of inscriptions, have been despatched to Mr. Bushby for transmission to the Hon'ble Court of Directors. If the Society are desirous to inspect these papers and feel disposed to take copies and to publish any of them, no difficulty will be experienced in accomplishing this object, upon application being made to Mr. Bushby.

I have the honor to be, Sir,

Your Obedient Humble Servant,

J. THORNTON.

Secy. to Govt. N. W. P.

With reference to the above correspondence, and to a statement read to the meeting that the Hon'ble the Governor of the N. W. Provinces considered that the former communication regarding the Mandah temples, had been neglected by the Society, it was unanimously resolved—

1—That the description of the Kallinger antiquities be published forthwith, and the drawings copied for the earliest possible publication.

2—That the cause of the delay in publishing the drawings of the Mandah Cave Temples, be explained to the Hon'ble the Governor of the N. W. Provinces.

Also received through Capt. Kittoe, 32 silver coins of Buddhist type, presented by Mr. Money—one set for the Society,—one for the Hon'ble Court—found on the site of an ancient town on the Soane.

From A. Shakespeare, Esq., Acting Secretary to Government N. W. Provinces, dated Jan. 6th, 1818, transmitting a copy of each of the Arabic works, entitled Tarcekh Yaminee and Kaleela wa Dumna.

From Mr. G. A. Bushby, presenting two ancient Greek coins purchased by Mr. Bushby at the Acropolis of Athens; and an ornament from a mummy exhumed by Mr. Bushby at Thebes.

From D. Cunliffe, Esq., Magistrate of Monghyr, forwarding for the examination of the Society 8 gold coins found at a village in the Per-gunnah Hevelec, Behar.

The 8 coins, which are of the Indo-Scythic group, were exhibited to the meeting, and referred to Mr. Laidlay and Major Anderson for Report.

From Dr. A. Campbell, Darjeeling, presenting a copy of the French edition of Bernier's Travels, 2 vols. 12mo. with Plates.

From H. Piddington, Esq., forwarding a notice of a remarkable hot wind in the district of Purnea. (Ordered for publication.)

From Dr. Irvine, Darjeeling, forwarding a paper entitled, "Observations on the probable results of a scientific research after the Metalliferous deposits in the sub-Himalayan range round Darjeeling. (Ordered for publication.)

From Mr. Blyth, forwarding extracts of letters from Signor Apparuti of Modena, and Mons. Malherbe of Metz, proposing exchanges of objects of natural history, with the Museum of the Asiatic Society. (Referred to the Section of Natural History.)

From the Rev. Mr. Street, of Bishop's College, presenting copies of a pamphlet, by the Rev. Mr. Driberg, entitled, "A Missionary Tour among the Gonds south of the Nerbudda, with a specimen of their dialect and grammar." (Ordered that the specimen be printed in the Journal.)

From J. Muir, Esq., regarding the Oriental works which he considers should be published by the Society: also suggesting renewed

efforts to procure a copy of the Pseudo-Yajur Veda composed by the Roman Catholic Missionaries, to facilitate the reception of Christian doctrines in India.

To the Secretaries of the Asiatic Society of Bengal.

GENTLEMEN,—With reference to the contents of pp. 1268—69 of the No. of the Society's Journal for December last, relative to the parts of the Vedas which should be published by the Society, I would take the liberty of offering the following suggestions for the consideration of the Oriental Section.

First.—It appears from Professor Wilson's letter of 17th September last, that only three out of the four Vedas are about to be printed in Europe. The fourth, or Atharva Veda, has not been taken in hand. Might not our Society undertake its publication? An account of the contents of this Veda may be found in the first of Dr. Roth's treatises on the History and Literature of the Vedas, translated in the Journal for August last, to which I have not at this moment the means of referring more particularly.

Second.—I think it appears from the same work that Dr. Roth was publishing an edition of the Nirukta, and that another scholar was bringing out in Germany the Aitareya Bráhmaṇa. It would therefore appear advisable that the publication here of these and any other parts or appendages of the Vedas which are reported to be likely to be printed in Europe, should be allowed to lie over, at least till other portions, for the printing of which no provision has been made in Europe, shall have been brought out. If indeed any of these Upanishads are of no great length (a point on which I am not informed) a reprint here of one or more which have already been printed in Europe would be of no great consequence, and would certainly render our edition complete.

I observe in Messrs. Smith, Elder & Co.'s Literary Circular from July to November 1847, a new work on the Vedas advertised, with the following title, which I beg to suggest may be added to the Society's Library:

“*Essai sur le mythe des Ribhaus, premier vestige de l'apotheose dans le Véda, avec le texte Sanskrit par F. Neve.*” 8vo. sewed, price 11. Paris.

I suggested to the Society several years ago that an attempt should be made to procure for the Library the original Sanskrit text of that curious work the Pseudo-Yajur-Veda, (of which some account is given in a paper by Mr. Ellis in one of the earlier Vols. of the Society's Researches, as well as in the English preface to Dr. Mill's Sanskrit poem, the *Christa Sangitá*) which the Roman Catholic missionaries composed several centuries ago to promote the reception of Christian doctrines. A French translation of this Pseudo-Veda or part of it, appeared at Yverdun towards the close of last century, which is perhaps in the Society's Library; but it appears very desirable that we should possess the original of so curious a work. In consequence of my former suggestion, Dr.

Wilson of Bombay was requested to use his endeavours to procure a copy; but I do not recollect to have heard the result. If no effective steps were taken towards the end in view, I would beg to suggest that the attempt should be renewed, and application made to any of the Society's Correspondents in the Madras Presidency, or in any quarter which may seem most likely to promise success. It was in the College of the Jesuits at Pondicherry, if I recollect right, that the manuscript was said to be deposited; and perhaps that establishment may have been broken up at the period of the French Revolution or from subsequent causes. If this, on enquiry, appear to be the case, the fate of the Library, and its present place of deposit, if still in existence, might be traced.

I have the honor to be, Gentlemen,

Your most Obedient Servant,

Calcutta, J.m. 20th, 1848.

J. MUIR, M. A. S. B.

Resolved, that M. E. Ghibelin of Pondicherry be requested by the Society to institute the search for the Pseudo-Yajur Veda, recommended by Mr. Muir.

Read a proposition from the Council, that Dr. Joseph Dalton Hooker, R. N. F. R. S. &c., &c. author of the Flora Antartica, late Naturalist to Sir John Ross' expedition, and who has accompanied the Earl of Dalhousie to India for the purpose of examining the Flora and natural productions of the Sikkim district, and eventually of Borneo—be elected an Honorary Member of the Asiatic Society. Dr. Hooker was accordingly elected by acclamation an Honorary Member of the Society.

Mr. H. M. Elliot, presented and read extracts from several reports from Capt. A. Cunningham, on the progress and investigations of the Tibet Mission. The Secretaries having undertaken to print the whole of the documents in the February number of the Journal, it was proposed by the Lord Bishop, seconded by Dr. O'Shaughnessy, and voted by acclamation, that the cordial thanks of the Society be presented to Mr. Elliot for the valuable aid he is affording to the Society's labours.

Dr. O'Shaughnessy read several extracts from a private letter to himself, from Professor Henry, of Princeton, United States, containing an account of the origin of the Smithsonian Institute, and remarks on several most important discoveries in physical science. The Secretaries were requested to publish the extracts read, and on the proposition of

Dr. O'Shaughnessy, Professor Henry was named for election as an Honorary Member of the Society.

The Report for 1847 having been brought up for final consideration, and a paragraph regarding the Subscriptions to the Society having been modified on Dr. Walker's suggestion, Dr. Walker's name was added to the Committee appointed to examine a proposal for the erection of a new Museum. Dr. Walker, with reference to the rules of the Society, read the following proposals :—

1. "That no alteration in the Rules, nor any extraordinary expense beyond (say) 500 Rupees, be sanctioned, except at the annual meeting of the Society ; and that before any such questions are finally decided, the Mofussil Members, as well as those residing in Calcutta, be called upon to vote on the same."*

"Before this proposition be carried into effect, it is desirable that the Rules of the Society should be made as perfect and complete as possible and that during the interval between each annual meeting, the functions of the Society be solely administrative, it is therefore proposed"—

"2nd—That the Council of the Society be appointed to revise the Rules, and that these be carefully compared with the rules of similar Institutions in Europe, and that copies of the latter, if they are not already in the Library, be immediately sent for overland." H. W.

After a short discussion, Dr. Walker's proposition, supported by Dr. O'Shaughnessy, was referred for consideration to the Council, who were requested to act upon the 2d para. thereof, at their earliest convenience.

The Report, with its several propositions, was then unanimously adopted.

LIBRARY.

The following books have been received since the last meeting :—

PRESENTED.

Notulae ad Plantas Asiaticas, Part I. *Developement of Organs in Phanerogamous Plants.* By the late W. Griffith, Esq. Edited by J. M'Clelland, Esq. (2 copies).—PRESENTED BY THE GOVERNMENT OF BENGAL.

Icones Plantarum Asiaticarum, Part I. *Development of Organs in Phanerogamous Plants.* By the late W. Griffith, Esq. Edited by J. M'Clelland, Esq. (2 copies).—BY THE SAME.

Journals of Travels in Assam, Burma, Bootan, Afghanistan and neighbouring countries. By the late W. Griffith, Esq. Edited by J. M'Clelland, Esq.—BY THE SAME.

Transactions of the Royal Society of Edinburgh, Vol. XVI. part III. and Vol. XVII. part II.—**BY THE SOCIETY.**

Histoire de la Literature Hindoui et Hindoustani, Par M. Garcin de Tassy. Tome II.—**BY THE ORIENTAL TRANSLATION FUND.**

Report of the Sixteenth Meeting of the British Association for the advancement of Science, held at Southampton in September, 1846.—**BY THE BRITISH ASSOCIATION.**

Record of Cases treated in the Mesmeric Hospital from June to December, 1847, (2 copies).—**BY THE GOVERNMENT OF BENGAL.**

Journal of the American Oriental Society, Vol. I. No. III.—**BY THE SOCIETY.**

Sketch of the Singphos, or the Kakhyens of Burmah: the position of this tribe as regards Bamoo, and the inland trade of the valley of the Irrawaddy with Yunnan, and their connection with the North-Eastern Frontier of Assam.—**BY THE GOVERNMENT OF BENGAL.**

Glossarium Sanscritum in quo omnes radices et vocabula usitatissima explicantur et cum vocabulis Græcis, Latinis, Germanicis, Lithuanicis, Slavicis, Celicis, comparantur, a Francisco Bopp, (p. 289 to p. 412).—**BY THE AUTHOR.**

The Journal of the Indian Archipelago and Eastern Asia, Nos V. and VI.—**BY THE EDITOR.**

The Calcutta Christian Observer, for February, 1848.—**BY THE EDITORS.**

The Oriental Baptist, No. 14.—**BY THE EDITOR.**

Proceedings of the 24th Anniversary Meeting of the Royal Asiatic Society.—**BY THE SOCIETY.**

Proceedings of the Royal Society, No. 67.—**BY THE SOCIETY.**

Proceedings of the Royal Society of Edinburgh, Nos. 29, 30.—**BY THE SOCIETY.**

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of December, 1847.—**BY THE OFFICIATING DEPUTY SURVEYOR GENERAL.**

Nityadharmañurananjiká, Nos. 32 to 41.—**BY THE EDITOR.**

Tatwabodhini Patriká, No. 54.—**BY THE TATWABODHINI SOBHA.**

Vocabulary and Phrases, in English, Mini and Abor. By Capt. E. F. Smith.—**BY THE AUTIOR.**

Kalila-wa Dumnah, in Arabic, translated from the Pehlavay by Ibn al Makaffa.—**BY THE GOVERNMENT OF THE NORTH WESTERN PROVINCES.**

Otby's Tarikh Yaminy, or the History of Sultan Mahmud of Ghuzneh, by a Cotemporary, edited in the original Arabic by Moulavy Mamluk-al Alyy, Head Moulavy, and A. Sprenger, Principal of the Delhi College.—**BY THE SAME.**

Madras Journal of Literature and Science, No. 32.—**BY THE LITERARY SOCIETY OF MADRAS.**

EXCHANGED.

The London, Edinburgh and Dublin Philosophical Magazine, No. 209.

PURCHASED.

Journal des Savants, September, 1847. .

The History of India, by the Hon'ble Mountstuart Elphinstone, 2 vols. 8vo.

Report of the Curator of the Museum of Economic Geology for the month of December 1847, and January 1848.

Economic Geology—Major Jenkins has forwarded to us some very beautiful specimens of Coal from Assam, from the last vein opened at Jaipur, the mines of which (for there are two of them) are situated on the opposite banks of the old Booree Dehing river. He accompanies it with the following extracts from Major Hannay's letters to him.

Extracts from letters from Major Hannay.

"In a previous letter he had stated that the native contractor who is now digging the coal had allowed the superincumbent stratum of clay and earth to fall over—he says, 21st October.

'I have at last cleared out the coal again, and if there were only boats, coal sufficient to last all the cold season could be sent off immediately.'

The ravine beyond the present coal, which rests on clay slate shows coal also, but apparently being superincumbent to the main mine; the coal is in small quantity, the uppermost vein however has a layer of capital Iron Ore lying on it. Taking it to be, as I suppose, this bed of coal with its different strata of sandstone, clay slate, clunch clay, shell, &c. is about 200 yards in breadth, and there is at least 14 feet of coal intermixed with clunch and soft partings in the present vein, but from being overtopped by a good high knoll there is much trouble in working it."

23d—"I am happy to be able to give you very favorable accounts of the coal mine, and I expect now, under proper management in working it out during this cold season, Government will be supplied with as much as they require of the finest article of the kind in India, but boats are the drawback; let any number be ready and coal is forthcoming for them. The plan is, in my opinion, for Government to work the coal for some time to come, as it is of too valuable a kind to waste in the way the natives do, and care should be taken that the mine does not fill up again during the rains. The steamers should be supplied from the inland mines, where a great portion of the coal is equally fit for their purposes, but the Dehing vein should be reserved for mint purposes, it is so valuable and should be taken care of; fancy 16 feet of coal, 10 of which is solid pure coal.

The bottom of the bed is bituminous clay slate, upon which rests a seam of highly carbonized coal, $4\frac{1}{2}$ feet thick* and, including a little soft partings, in all 6 feet of solid coal; it is the most beautiful thing I ever saw, as the coal is so pure it shines as if chrystalized; this is all cannel coal and highly valuable for the mint or forge purposes."

The larger specimens arrived but a few days ago by the steamer, but as Major Jenkins has sent us some specimens by dawk I have examined the largest of them, and the result is as follows.

Coal from the banks of the Booree Dching in Assam, sent by Major Jenkins.
This coal is a very handsome cannel coal, of specific gravity 1.31 burning with a good flame; not swelling or melting like the common bituminous coal, except in one or two spots, but preserving, whether burnt in the air or coked, all the sharp angles of its fractures for a long time.

It contains in 100 parts as follows:—

Water and gases,	.....	.....	5.50
Bituminous matter,	.....	.....	28.00
Carbon,	.....	.....	56.50
Ash,	.....	.....	10.00
			100.00

A separate experiment gave for the per centage of coke 57.14, but the fragment was taken probably from a different block or vein.

Major Jenkins has also sent a good collection of the clay iron ores from the coal beds of Upper Assam. They are massive and nodular hydrates of the oxide of iron, in the usual laminar concretions, which these ores affect. These are accompanied also by a good supply of the magnetic iron sand from the Sookee Dooars under the Cossyah hills in Kamroop.

Captain Fitzgerald, of the Nizam's service has favoured us with a more detailed memorandum relative to the Nizam's great diamond, of which the model was exhibited at the November meeting, and I have had some glass models cast from the leaden one, from which I have calculated the gross weight and that which the stone would have when polished. The results of this I have embodied in a note as a short paper for the Journal, which will thus place upon record this remarkable addition to our knowledge of these extraordinary gems.

No. 72 of our Indian copper ores, which was one sent from the Khetree hills near Jyepoor, by Major Thoresby (Journal Vol. X. p. 168,) and found by me amongst some old specimens and rubbish, I had put by for examination, as it had the appearance of containing Cobalt or Nickel, and upon examination, I find it does contain Cobalt. Our specimen is too small to admit of a quantitative analysis, but the locality is perhaps new.

* The specimens accompanying are from this $4\frac{1}{2}$ ft. vein.

From J. Homfray, Esq. we have received 6 copies of his "further observations on the coal fields of the Damoodah and Adji," in continuation (and a most valuable one) of that published in the Journal for 1842, p. 739.

From H. Michell, Esq. we have two splendid specimens, the one of the rich argentiferous Galena of Australia, containing he says about 200 oz of silver per ton of lead, and the other a rich ore of grey copper said to contain 50 per cent. of metal.

Geological and Mineralogical—We have received from the Revenue Survey Office eight copies of Captain Sherwill's geological maps of zillahs Shahabad and Behar, which have been lithographed and coloured there from the originals in our possession.

Major Jenkins has also forwarded to Government the specimens collected on the Nuga Agami Hills by Mr. Masters, whose report will appear in a forthcoming number of the Journal.

We have received through the Rev. Mr. Pratt, a paper of observations on the probable result "of a Scientific research after metalliferous deposits in the sub-Himalayan range round Darjeeling," with a collection of small specimens of the rocks and minerals of that neighbourhood, by Dr. R. H. Irvine, Civil Surgeon of Patna.

From Mr. A. Mitchell, of Gussery sugar-works, we have a fine Saurian tooth from Inverkeithing, a shell from the Sylhet limestone, and a cast or fossil from the old red sandstone of Forfar.

Printed copies of Mr. Blyth's Catalogue of the collection of Australian Vertebrata exhibited at the October meeting, were laid on the table.

With reference to the rule of the Society passed at the February meeting, 1848, and embodied in the Annual Report, we certify the above minutes of proceedings to be correct.

J. W. COLVILE, *President.*
W. B. O'SHAUGNESSY, *Hon. Sec.* } *Of the evening.*

Astronomical Register kept at the Surveyor General's Office, Calcutta, for the Month of Feb. 1848.

Days of the Month.	Maximum Pressure observed at 9h 50m.				Minimum Pressure observed at 4p.m.				Rain Gauges.	Elevation.	Frost 1 Foot	40° F.	Lower	Upper	Inch	Inch	Moon's Phase.					
	Barometer to 32°	Reduced to 32°	Temperature.	Wind.	Aspect of the Sky.	Barometer to 32°	Reduced to 32°	Temperature.	Wind.					Barometer to 32°	Reduced to 32°	Temperature.	Wind.	Aspect of the Sky.	Barometer to 32°	Reduced to 32°	Temperature.	Wind.	Aspect of the Sky.
1	29.961	72.4	73.0	70.4 N.E.	Clear.	29.829	86.9	86.1	67.9 S.W.	Cumuli.	87.6	...	...	...	...	...	...	...	...	...	...	...
2	.966	77.9	62.8	62.7 N.E.	Cumuli.	.813	86.1	85.0	67.8 S.W.	Ditto.	87.0	...	...	...	...	...	...	...	...	...	...	...
3	.997	67.3	67.0	51.2 N.W.	Clear.	.901	72.1	71.0	51.9 N.W.	Clear.	73.4	...	...	...	...	...	...	...	...	...	...	...
4	30.088	67.7	67.5	53.1 N.W.	Ditto.	.942	74.8	73.3	54.8 N.W.	Ditto.	76.0	...	...	...	...	...	...	...	...	...	...	...
5	.075	68.6	69.6	56.0 S.E.	Ditto.	.940	78.0	80.0	60.2 W.	Ditto.	80.0	...	...	...	...	...	...	...	...	...	...	...
6	.079	68.0	68.8	68.9 S.W.	Ditto.	.900	84.9	83.9	66.3 W.	Ditto.	85.2	...	...	...	...	...	...	...	...	...	...	...
7	.019	75.7	76.1	70.0 W.	Ditto.	.915	86.0	85.0	66.0 N.	Ditto.	87.0	...	...	...	...	...	...	...	...	...	...	...
8	.172	68.8	68.9	56.9 N.	sharp.	.30.038	70.2	77.6	60.4 N.W.	Ditto.	80.1	...	...	...	...	...	...	...	...	...	...	...
9	.200	69.4	70.4	66.2 N.E.	Ditto.	.042	82.0	80.9	61.0 N.W.	Ditto.	83.0	...	...	...	...	...	...	...	...	...	...	...
10	.133	73.1	74.0	61.8 N.	Ditto.	.015	85.2	83.8	64.0 N.W.	Ditto.	85.8	...	...	...	...	...	...	...	...	...	...	...
11	.123	74.4	75.3	67.9 N.	Ditto.	.29.992	86.4	84.9	67.8 N.W.	Ditto.	87.0	...	...	...	...	...	...	...	...	...	...	...
12	.15	72.9	72.6	70.9 N.N.E.	Cirro cumuli.	.687	85.8	84.9	67.9 N.W.	Cumuli.	87.0	...	...	...	...	...	...	...	...	...	...	...
13	.064	76.5	77.0	71.9 W.S.W.	Ditto.	.898	86.1	81.2	71.6 N.sharp.	Cumuli.	85.5	...	...	...	...	...	...	...	...	...	...	...
14	.113	73.2	73.4	67.6 E.N.E.	Ditto.	.30.006	81.4	80.0	67.6 N.E.	Cumuli.	81.7	...	...	...	...	...	...	...	...	...	...	...
15	.184	73.9	74.2	65.7 E.	Clear.	.052	83.0	81.8	67.3 N.	Cumulo strati.	84.3	...	...	...	...	...	...	...	...	...	...	...
16	.191	72.3	73.0	64.4 N.W.	Ditto.	.009	83.9	83.1	60.9 N.W.	Clear.	84.8	...	...	...	...	...	...	...	...	...	...	...
17	.084	75.0	76.0	67.0 S.W.	Cirro cumuli.	.29.911	86.7	87.2	71.6 N.W.	Cirro cumuli.	89.5	...	...	...	...	...	...	...	...	...	...	...
18	.072	74.7	75.0	73.0 N.W.	Cloudy.	.917	88.8	87.4	72.3 W.	Cloudy.	89.6	...	...	...	...	...	...	...	...	...	...	...
19	.046	75.9	76.2	68.7 N.W.	Cloudy.	.896	86.5	85.6	72.7 W.	Cumuli.	87.3	...	...	...	...	...	...	...	...	...	...	...
20	.077	75.5	75.6	73.0 N.W.	Cirro cumuli.	.907	87.3	86.4	74.8 N.W.	Ditto.	87.9	...	...	...	...	...	...	...	...	...	...	...
21	.034	77.9	78.0	73.6 S.E.	Hazy.	.893	89.3	87.9	74.8 N.W.	Cumulus.	90.0	...	...	...	...	...	...	...	...	...	...	...
22	.020	78.3	78.6	72.1 E.	Cumuli.	.900	88.0	86.3	72.3 N.W.	Hazy.	90.3	...	...	...	...	...	...	...	...	...	...	...
23	.29.907	79.6	80.9	69.3 N.W.	Clear.	.837	91.9	91.0	73.0 W.S.W.	Clear.	92.7	...	...	...	...	...	...	...	...	...	...	...
24	.56.92	78.8	79.8	74.4 S.W.	Ditto.	.835	93.1	91.9	69.8 W.	Ditto.	93.8	...	...	...	...	...	...	...	...	...	...	...
25	.30.021	80.2	80.9	74.9 S.W.	Cirro cumuli.	.899	94.2	93.0	73.1 N.W.	Cirro Cumuli.	95.4	...	...	...	...	...	...	...	...	...	...	...
26	.000	81.4	81.9	70.3 N.W.	Cloudy.	.868	89.2	88.8	71.0 N.	Clear.	91.4	...	...	...	...	...	...	...	...	...	...	...
27	.29.987	79.4	79.2	66.0 N.W.	Clear.	.767	90.4	89.8	70.2 S.W.	Ditto.	91.6	...	...	...	...	...	...	...	...	...	...	...
28	.859	80.2	81.0	66.0 N.W.	Ditto.	.762	89.5	88.3	70.0 W.S.W.	Ditto.	90.9	...	...	...	...	...	...	...	...	...	...	...
29	.816	77.8	78.9	70.3 N.W.	Ditto.	.682	91.2	90.3	67.5 W.S.W.	Ditto.	92.0	...	...	...	...	...	...	...	...	...	...	...
Mean	30.054	74.7	75.2	66.5																		86.9

A smart shock of Earthquake on the 20th at 5h. 35m. P.M.

ANNUAL REPORT.

THE Council of the Asiatic Society having reviewed the proceedings of the year just terminated, are happy in being enabled to congratulate the members on a marked improvement in their affairs.

At the close of 1846, the number of subscribing members was, ..	136
There have been elected in 1847,	48
Rejoined the Society on return from Europe.....	5
	—
	189
Of which number, deceased during 1847.....	3
Resigned,	8
Proceeded to Europe,.....	12
	—
	23
	—
	166

Showing an increase above all casualties of 30 Subscribing Members during 1847.

The Honorary Members are,	42
The Associate Members,.....	11
	—
Total, 219	

FINANCES.

In conformity with the resolution passed in October 1846, the officers of the Society then elected, proceeded on their receiving charge on the 16th of November 1846, to liquidate the old debts of the Society from the proceeds of the sale of Company's paper, and the Cash balance in the Bank of Bengal. Their next care was to publish the whole of the accounts for the previous years, as received from the then Accountant, Mr. Bolst, and which accounts had not been previously printed. Mr. Muller having been appointed on the 16th Nov. to succeed Mr. Bolst as Accountant under the directions of the Senior Secretary, the accounts now submitted commence accordingly from that date, 16th November 1846, balanced to the end of 1846; and a separate account is rendered for all

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1847. The Secretaries and Accountant request permission to place on record that their strict responsibility for the application of all funds according to the instructions of Government and the resolutions of the Society, commences with the 1st January, 1847, as during the preceding six weeks the income of the Society from all sources, was under pre-engagements, over which they had no control.

The Council now submit—

1. Statement showing the amount of Government paper and the Cash balance received to the credit of the Society from Mr. Bolst, on the 16th November 1846.
2. An abstract statement of the old debts of the Society paid from the sale of the Company's paper and cash balance thus received.
3. Abstract statement of accounts from 16th Nov. to 31st Dec. 1846.
4. Abstract statement of accounts from 1st January to 31st Dec. 1847.
5. Detailed statement of account of the Oriental Publication grant of 500 Rs. per mensem, in account current with the Asiatic Society, from the 1st Jan. to 31st December 1847.

Statement showing the amount of Co.'s Papers and Cash received from Mr. Bolst, and how disposed of in liquidation of old debts.

	RECEIPTS.	Co.'s Rs. As. P.
Co 's Papers. { for Sa. Rs.	4,000 }	sold for 13,137 13 11
{ Co.'s Rs.	8,800 }	
Cash,	1,309 12 9	
Ditto acct. Journal,	482 0 4	
		1,791 13 1

Co.'s Rs. ... 14,929 11 0

DISBURSEMENTS FOR OLD DEBTS.

Mr. Bird's Portrait,	1,368 8 9
Bishop's College, arrears for printing Journal, &c. from January 1843 to May 1846,	7,441 15 0
Baptist Mission Press arrears for printing Journal down to July 1846, ..	418 0 0
Meers. Currie and Co. for Almirah, &c.....	425 14 0
Meers. Ostell and Lepage for Books,	122 4 0
Mr. Blyth's arrears of Salary from 1st May 1844, to October 1846, at 100 Rs. per month,	3,200 0 0
Ditto House Rent from January to November 1846 at 40,	440 0 0
Mr. Piddington's arrears of Salary,	200 0 0
Sundry arrears,	1,313 1 1
Co.'s Rs. ...	14,929 11 0
E. E.	

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The Accounts herewith published show the total receipts from all sources during the year 1847, to have been,	28,731	15	6
Of which Government allowances,	13,664	0	0
Subscription from Members,	9,569	13	6
Journal and sale of Publications,	1,728	0	0
Sundries,	47	14	3
	25,009	11	9
Co.'s Paper received from Mr. Bolst, and sold during this year to pay Mr. Blyth's arrears of salary,	3,722	3	9
Co.'s Rupees,	28,731	15	6
Balance of 1846,	2,270	0	6
Do. from Journal,	482	0	4
	2,752	0	10
	31,484	0	4
The expenditure has been—On account of Oriental Fund—Invested in Co.'s			
Paper,	3,997	2	1
Sundry expenditure,	2,332	11	11
	6,329	14	0
Geological and Mineralogical department,	3,805	3	3
Zoological Department,	9,363	14	9
Journal, including 7 Nos. of former year,	4,800	9	4
Library,	3,016	3	4
Secretary's office,	1,255	9	0
Sir A. Burnes' Drawings,	1,001	15	0
Miscellaneous,	905	10	5
	30,479	4	1

The accounts further show that the Government Contributions have been carefully applied during the year to the purposes for which the Funds were granted.

Thus—for the Oriental Fund, the receipts have been,	6,031	14	0
Disbursements,	2,332	11	11
Funded to Oriental Acct.	3,997	2	1
	6,329	14	0

Dr.	Zoological Museum.	Cr.
To Amount of Mr. Blyth's Salary as Curator for 12 months at 250 Rs. per month,	3,000 0 0	By Amount of allowance authorized by the Court of Directors for the Services of a Curator for 12 months at 250 Rs. per month, 3,000 0 0
„ Ditto house rent for ditto at 40 Rs. per month,	480 0 0	„ Ditto for preparation of specimens at 50 per Do.,
„ Ditto in full of the arrears of his Salary from 1st May 1844 to October 1846, at 100 Rs. per month,	*3,200 0 0	„ Amount of fines, 600 0 0
„ Ditto Establishment of Taxidermists, Artists, Carpenters, &c. for 12 months	1,750 0 0	„ Ditto of empty bottles sold, 6 7 9
„ Ditto of Contingencies for ditto,	793 7 3	3 0 6
Ditto paid by Mr. A. Campbell to Mr. Holquett for proceeding to Dargeling in November 1842,..	*70 0 0	3,609 8 3
Ditto of a Glass case for depositing Shells,	70 7 6	
Co.'s Rs. ...	9,363 14 9	Co.'s Rs. ... 3,609 8 3

Dr.	Museum Economic Geology.	Cr.
To Amount of Mr. Piddington's Salary as Joint-Curator for 12 months at 250 Rs. per month,	3,000 0 0	By Amount of allowance granted by Government for the services of a Joint-Curator for 12 months at 250 Rs. per month,
„ Ditto of Establishment for ditto at 31 Rs. per month,	372 0 0	„ Ditto for Establishment and contingencies for ditto at 64 Rs. per ditto,
„ Ditto of Contingencies for ditto,	149 13 0	„ Ditto for four Glass Cases, 768 0 0
„ Ditto for 4 Glass Cases granted by Government for the use of the Museum, 296 0 0		296 0 0
„ Less paid on the 24th November 1846, 80 0 0		
Sundries,	216 0 0	
	67 11 3	
Total Co.'s Rs. ...	3,805 8 3	Co.'s Rs... 4,064 0 0

* These two items constitute extraordinary expenses defrayed from the Society's assets, and show the regular year's outlay in this department to have been Rs. 6,093 14 9.

Liabilities and Dependencies.

The Journal has been paid for up to the end of the
2nd Quarter of 1847, and there remain due for the
3rd and 4th quarters, including the December No.,
errors excepted,..... Rs. 2,000 0 0

To meet this the Society has in reserve the whole of
the collections still to be made for the last quarter
of 1847, and the average amount of which will be,
errors excepted, 2,300 0 0
Subscriptions to the Journal up to Dec. 1847..... 1,700 0 0

Total, 4,000 0 0

Excluding these two items the result of the year has been, that defraying all expenses and incurring no fresh debts or liability, and strictly applying all grants from Government to the precise purposes for which these were conceded, there is a cash Balance in the Society's favour of Rs. 504 12 3 on the total income and expenditure of the year—there is also a *surplus* and certain dependency above liabilities, accruing from Subscriptions and Journal, of at least 2000 Rs. fairly available for next year, in addition to ordinary income and to the collections of arrears of subscriptions, now Rs. 5000, not including the last quarter's subscriptions, of which arrears one half may be fairly expected to be realized in all 1848.

Stringent resolutions having been passed at the October meeting for the removal from the list of Members of all those who are in arrears of more than 15 months' subscriptions, 3 months' notice having been given, the Council advise that this resolution be carefully attended to and enforced. They further recommend that the old practice of the Society to absolve members of 20 years' standing from any further payment, be recognised as a formal rule.

Propositions having been received from two members of the Society for the reduction of the rates of subscriptions, the Council have carefully considered the proposal, and in consultation with their Accountant have

unanimously agreed that no reduction is practicable, consistent with the efficiency and safety of the Society. Two members have also complained that, residing in the Mofussil, they derive no advantage from the Society beyond the receipt of the Journal. On this the Council observe, that it is manifestly the duty, as well as the interest of the Society, to facilitate in every practicable manner, the researches of its members, by providing standard works of reference in the Library—by permitting such works as extensive circulation as is consistent with their safety—by the formation of standard collections of specimens for comparison in the several Museums—and above all by the maintenance of a Periodical Journal, in which the researches of members may find immediate and extensive publicity. The Council are willing to consider favorably any proposition that may be made for remedying the inconvenience complained of, and for rendering, under due precautions for the safety of the Books and other articles, the Library and collections of the Society more available to members resident in the Mofussil. The Council however, are not at present prepared to suggest any specific measure on this subject, and conceive that any measure of the kind that may be proposed will require to be very carefully considered.

PUBLICATIONS.

Under the head of Publications the Journal claims the most conspicuous notice.

On the change of officers in November 1846, the Journal was 7 months in arrear. All these numbers have been published and paid for, and this year's series completed by the issue on the 7th of January 1848, of the number for the previous month. The 12 Nos. for the year form a Volume of 1277 pages, with index, illustrated by numerous plates, and containing a mass of original papers, embracing a wide range of subjects of interest and value to the Philologist and Antiquarian, as well as to the cultivators of natural and physical science.

The Council cannot permit this occasion to pass by without recording their grateful sense of the important services rendered in this department during the past year by their Co-Secretary, Mr. Laidlay, under whose management the Journal has been almost exclusively edited.

The zeal, ability and indefatigable industry with which Mr. Laidlay has discharged this laborious duty, entitle him to the marked thanks of the Society.

For the information of contributors to the Journal, it is desirable to add; that 333 copies are regularly circulated, of which, 169 to Members, 53 to subscribers not Members, 40 to the Hon. the Court of Directors, 60 to Europe generally, and 11 to learned Societies and individuals.

By a vote of the November meeting, *Honorary Members* residing in Europe, are entitled to receive the Journal gratis, on application to the Agents in London, Messrs. Allen and Co., to whom 40 copies are regularly forwarded by each monthly steamer from Calcutta.

With reference to the very large stock of the "Researches" in store in the Library, or in charge of the home agents, the Council propose that all members who have paid up one year's subscription, and all Honorary members, be held entitled to a copy of each volume of the "Researches" available above five sets retained for the Library.

Oriental Publications.

The Society are aware of the active measures taken during the past year to fulfil the desire long since expressed by the Hon'ble the Court of Directors, for the publication in India of a complete Edition of the Vedas, with a Translation and Commentary. Having confided this important task to their accomplished Co-Secretary, Dr. Roer, the Council heard with regret in November, that their views and Dr. Roer's labours had been directed in vain, and that such progress had already been made in England under the patronage and at the expense of the Honorable Court in the Edition of the same Veda on which Dr. Roer was employed, that it became necessary to discontinue the Calcutta Edition.

As the Yajur Veda and Sáma Veda are also in course of publication in Berlin and St. Petersburgh, the Council earnestly invite the attention of the Society to an able minute by Mr. Laidlay, regarding the works which should be now undertaken, and the manner in which these should be published. Mr. Laidlay proposes the monthly issue of a companion number of the Journal, containing Serial portions of Editions of such standard Oriental works as may be thought most

desirable to issue. He suggests the employment of an Editor, and native assistant, on salaries together not exceeding 150 Rs. per mensem, the control of the work to be vested in the Oriental Section.

Fully concurring in Mr. Laidlay's views, the Council advise their adoption, and recommend the appointment of Dr. Roer as Editor, under the superintendence of the Oriental Section. The Council are of opinion that in justice to Dr. Roer, a certain portion of his Edition of the Vedas should form the 1st and 2d Fasciculus of the proposed work. They are convinced that this publication will afford satisfactory proof of Dr. Roer's high qualifications for the difficult and laborious duties he has undertaken to perform. They also suggest the reinforcement of the Oriental Section by the appointment of Mr. H. M. Elliot and Mr. W. Seton Karr, who have recently arrived at the Presidency, and whose attainments in Oriental literature are so well known to the members of the Society.

Considering the importance of obtaining the co-operation and advice of eminent Oriental Scholars in India and in England, in order successfully to carry out the purposes for which the Government grant was bestowed, the Council recommend that the following names of distinguished non-resident Orientalists be added to the Section, and that these gentlemen be requested to lend as occasion may offer, their earnest and effective assistance to the resident Committee as an additional assurance to the Hon'ble Court of the Society's anxiety, as well as ability, to accomplish the objects of this grant.

Professor Horace Hayman Wilson—Mr. Hodgson, Dr. Sprenger, Mr. Walter Elliott, and Dr. Bird.

Mr. Bushby at the same time desires to be relieved from the duties of this Section.

L I B R A R Y.

The Library has been augmented during the year to the extent of 257 volumes, a new catalogue has been prepared by the Librarian and approved of by the Council, and should be printed without further delay. The number of Books borrowed by subscribers during the year has been 1150 volumes. The Council have every reason to be satisfied with the manner in which the Librarian has discharged his duties. He has been punctual in attendance, and has in all other respects acquitted himself in a very creditable manner. It deserves special notice that by his zeal

and exertions the sale of the Oriental Publications has been remarkably increased (from Rs. 777 7 3 in 1846, to Rs. 1706 12,) in the year now terminated.*

The Council regret to state that the Naturalists of the Society complain justly of the very scanty supply of standard books in their Department of the Library. Admitting and lamenting the deficiency, the Council are unable to advise any immediate measure for the supply of the requisite works, which are so costly that their purchase would cause an expenditure of from 10,000 to 15,000 Rupees. An efficient Library Committee would probably be enabled to do much within a reasonable time towards obviating the defect complained of, by a judicious use of the profits accruing from the sale of the Society's publications, and by a system of exchanges with other learned Institutions. The appointment of a Library Committee seems the first step which should be taken, and the Council accordingly propose that Dr. Walker, Dr. Roer, Mr. Wilby, Mr. J. W. Grant, Mr. Elliot and Mr. Welby Jackson, be requested together with the Secretaries, to act as this Committee, and examine into and report on the best means of supplying the most important works of reference required in the different departments of the Society's labours—and to report upon the practicability or otherwise of extending the circulation of works of reference to the Mofussil members.

THE GENERAL MUSEUM

Of Antiquities and Curiosities has been enriched by numerous and valuable donations. An ample and interesting catalogue has been prepared by the Librarian, approved of by the Council, and will, with the Catalogue of the Library, be printed immediately.

The number of visitors to the General Museum has been very large during the past year, over 16,000 persons having been admitted. It is satisfactory to add that although the humblest classes have been allowed free access, no theft or injury to any article has taken place,

* Statement of the amounts received by the Sale of Oriental Publications.

In	Rs.	.....	.....	.....	.....	.....	.....	.....
1842	829	8	0					
.. 1843	696	8	0					
.. 1844	424	4	9					
.. 1845	1047	10	0					
.. 1846	777	7	3					
.. 1847	1706	12	0					

Report.

a result, the Council consider, creditable to the vigilance and attention of the resident sergeant, Mr. Halagan, whose services they consider of proved value to the Society.

NATURAL HISTORY.

In the Department of Natural History numerous additions have been made to the Society's collections, most of which have been described in the Reports of the Curator Mr. Blyth, whose regularity of attendance and remarkable industry the Council consider deserving of favourable notice. It is however a subject of great regret to the Council, and of complaint on the part of numerous members, that no Catalogue exists of any part of the collections under Mr. Blyth's care. The Executive officers of the Society have at the instance of the Council repeatedly urged this deficiency on Mr. Blyth's attention, but as yet without result. The Council now advise that the Curator be formally instructed to prepare a descriptive Catalogue without further delay, and submit the same by monthly portions through the Section of Natural History, to the Council, and the Society at large. It is further recommended that Lord Arthur Hay and Dr. Walker be elected members of the Section of Natural History, and that the Section be invited to report monthly on the progress made in the Catalogue, as well as on any other matters of interest in their department.

An application has been received from Mr. Blyth since the December meeting, in which he seeks a recommendation in his behalf to the Hon'ble the Court of Directors in support of his claim for increase of pay, and for a retiring pension, after a certain period of additional service.

Without entering on discussion as to Mr. Blyth's particular services, the Council submit his request to the consideration of the Society at large. It must be admitted, that for any scientific man capable of discharging the duties on which Mr. Blyth is employed, and performing these with activity and zeal for the advancement of science and the improvement of the collections of a public Institution, the salary of 250 Rupees is a very inadequate compensation. But the Council cannot but regard the present as an inauspicious period to address the Hon'ble Court in furtherance of any pecuniary claim. The diversion of the Oriental grant to so large an amount as has but lately been

brought to notice, cannot be regarded with indifference by the Hon'ble Court, nor can it have disposed them to entertain with much favour any fresh demand on their munificence preferred by the Society. With these remarks the Council submit Mr. Blyth's application to the consideration of the meeting, recommending that it be referred to the section of Natural History for their report to the Council prior to the next meeting, and that the Section be invited to inquire into and report on the state of the Museum of Zoology, the extent to which the Society are indebted to Mr. Blyth for his services in that department, and to offer such suggestions as to its improvement and extension as they may deem desirable.

DEPARTMENT OF GEOLOGY AND MINERALOGY.

The acquisitions of specimens and collections have been numerous during the year—the reports of the Curator valuable. The Council are happy to record their satisfaction with the arrangements and catalogueuing by the Curator, Mr. Piddington, of the part of the Museum under his control.

In reviewing the subject of the Collections, Museums and Library, the Council wish to take prominent notice of the very insufficient space for arrangement, display or even preservation, of their property, afforded by the present premises. In every department collections of great value are so heaped together that their utility and even their interest are almost nullified. The Society generally are but little aware of the riches they possess, and which more ample space would enable them to display with equal advantage to the public and credit to themselves.

The Government have within the last month liberally conceded to the Society the small piece of ground on the Chowringhee front, lately occupied as a Police Thanna. With this ground available there exists sufficient room for the erection of a Museum, in which the Sculptures, Busts and Monuments, the fossils, Osteological and Mineralogical collections, with the arms, standards, pictures and models, could be displayed in a manner worthy of this Society, and even of national importance, as evincing the encouragement afforded by Government and the Society to the cultivation of every branch of science and literature connected with the history, the manners, the arts and productions of India.

The difficulty which exists as to the execution of this plan is the want of adequate funds, and this is increased by the present commercial pressure and the circumstances which discourage any present application to Government for pecuniary assistance. The Council are nevertheless of opinion that the object may be accomplished with success and safety, by having the requisite buildings erected on mortgage of the new premises, and which would entail a monthly charge of from 150 to 200 rupees a month. This may partly be met at first from the proceeds of sale of duplicate specimens of Natural History, and by the opening of a subscription among the members, and by the surplus income of the Society, which may next year be fairly expected to reach 3000 Rs. Subsequently whenever vacancies arise, the Council consider it would be highly advantageous that the *Curators* in the Zoological and Geological departments should be also *Professors and Lecturers* in their several branches, and that courses of lectures for elementary instruction be delivered on *Geology and Mineralogy* and on *Natural History*, open to the public and to regular pupils, on the payment of a moderate fee, the proceeds to be applied to the rent charge, and to the remuneration of the Professors in addition to their present scale of allowances. The Council have reason to believe that such classes would command a numerous attendance, and be very favourably regarded by the public. By this addition to their sphere of exertion the Society would assimilate itself to the Royal Institution of London and the Royal Society of Dublin—and would soon establish such enhanced claims on the consideration of Government as might justify a claim for considerable assistance towards the liquidation of the mortgage debt.

Impressed with the importance of this subject, the Council propose that the President, Mr. Bushby, Mr. J. Ward, Mr. Grey, and the Secretaries, be appointed a special Committee to examine and report on the practicability of carrying the proposed measures into effect. Meanwhile the Council should be authorized to enclose the piece of ground granted by Government, and take the requisite steps for the repairs of the present premises, now urgently required; to provide the requisite means for which the cash balance and surplus dependencies from 1847 should be reserved exclusively.

GENERAL ARRANGEMENTS, RULES, &c.

The Council have to report their opinion that the appointment of Sections has been attended with much success, and recommend their re-election for the ensuing year. Some discussion having arisen as to the mode of election of the Secretaries to the Sections, the Council now advise that each Section or Committee appoint its own Secretary, subject to confirmation by a general meeting—further that each Section be authorized to appoint not more than four corresponding members, not members of the Society, who may be residents in India, liable to re-election, and having no voice or vote in the Society's discussions or affairs. The Council again consider it necessary to urge that the functions of the Sections be limited to those already prescribed, and that they can have no control over Funds, nor dispose of collections, nor institute any official correspondence, except with the Society itself and their own regular corresponding members. The President and Secretaries should moreover, in the opinion of the Council, be ex-officio members of all Sections.

Rules.

To obviate as much as possible the occurrence of discussions which may interrupt the scientific or literary proceedings of the Society, the Council advise that no change of rules or institution of new rules shall take place in future, except at the annual meeting, or at an extraordinary meeting convened for the purpose, on the requisition of 12 members, addressed to the President.

The rule prohibiting the publication of the "Proceedings" till after having been submitted to the following meeting, the Council recommend to be abolished, as useless and inconvenient. The proceedings of the meetings are but a 'Proces Verbal' of the facts which have occurred—and delaying their publication retards that of the Journal—deprives contributors of what is so valuable to many, the immediate publication of the date of presentation of their papers—and withdraws from the public for at least a month numerous miscellaneous notices of discoveries and literary researches, which to the mass of readers and the public generally constitute the most interesting portion of the contents of the Journal. As however experience has shown that in reporting the proceedings oppor-

tunity is afforded for the insertion of opinions or expressions to which members may reasonably object, it is recommended by the Council that the report of proceedings be signed by the Secretary and countersigned by the President of the evening, who thus become individually responsible for the restriction of the report to the mere business of each meeting.

COUNCIL.

The functions of the Council should, to obviate embarrassment, be defined by rule, to be what in practice these have always been, that of a managing body empowered to represent the Society on all urgent occasions, and to have entire control over all honorary or paid officers of the Society, subject to the approbation of a general meeting, and restricted from incurring any expenditure above Rs. 200, except by a vote of the Society. It is recommended that their number be increased to 12, and that Dr. Walker, Mr. Seton Karr, Lord Arthur Hay and Dr. James Dodd, be elected members for the ensuing year.

PRESIDENT.

The Council are unanimously of opinion with respect to this office, that the original practice of the Society should be reverted to; that the Governor General should be respectfully solicited to become the *Patron* (not President) of the Society, and the Council be authorized to take the necessary steps on Lord Dalhousie's arrival, to submit the desire of the Society to his Lordship's consideration; further that a President be elected from their own body. The Council accordingly are happy to announce that they have received a requisition from 27 resident members* inviting Mr. J. W. Colvile, the Advocate General, to accept

* The undersigned, Vice-Presidents and Members of the Asiatic Society, being of opinion that the old and established usage of the Society regarding the office of President should be reverted to, on the occasion of the vacancy about to take place by the departure of Lord Hardinge, have the honor to propose for the consideration of the Council, and recommendation to the Society at the next general meeting, that Mr. J. W. Colvile be elected President of the Society.

Asiatic Society, 28th Dec. 1847.

D. CALCUTTA.

W. GREY.

J. P. GRANT.

J. W. LAIDLAW.

G. A. BUSHBY.

DEBENDERNATH TAGORE.

the office about to be vacant by Lord Hardinge's departure.* The Council unanimously recommend Mr. Colvile's election, feeling persuaded that it is not in some special acquirement, such as that of Oriental learning, or in the profound knowledge of some department of natural or physical science, that the most requisite qualifications for their President consist. General ability, love of literature and science, anxiety for the interests and advancement of the Society, courtesy and encouragement to its members and punctual attendance at its meetings, would in the opinion of the Council, constitute qualifications very much more conducive to their prosperity and effectiveness. The Council consider the election of Mr. Colvile the best which could be made upon these views, and they accordingly recommend that it take place at the next general meeting after Lord Hardinge's departure.

They further advise that as a mark of their high sense of the value of Mr. Iaidlay's great exertions during the past year, that gentleman be elected a Vice President of the Society, retaining his office of Co-Secretary; further that Mr. H. M. Elliot be elected a Vice President, in succession to Colonel Forbes.

The Council lastly repeat their congratulations on the improvement which has taken place in the circumstances and efficiency of the Society, on the increase to its number of members, and the improvement of its finances, exhibiting for the first time for several years, a balance on the credit side, notwithstanding the exact application of each fund to its special and authorized use. The Council also observe with much pleasure

ARTHUR BROOME.	W. SETON KARR.
JOHN H. PRATT.	H. L. THUILLIER.
W. B. O'SHAUGHNESSY.	G. LAMB.
WELBY JACKSON.	R. W. FRITH.
JAS. DODD.	HOREEMOHUN DEY.
JAS. C. THOMPSON.	T. E. ROGERS.
S. SLATER.	ROMMANATH TAGORE.
J. W. GRANT.	NREPENDERNATH TAGORE.
E. CURRIE.	S. G. T. HEATLY.
WM. KEANE.	RAJAH RADHAKANT DEB.
D. STEWART.	

* It having been previously ascertained that the senior Vice-Presidents, the Lord Bishop of Calcutta and the Hon'ble Sir John Peter Grant, the former on account of delicate health, and the second with reference to his being about to leave India, could not accept the office of President, if elected.

the strong inclination which manifestly exists and is increasing among the members to renewed efforts to maintain the long proved reputation of the Society, and to add to its claim on public estimation. The pages of the Journal are again enriched by the essays of some of the Society's oldest and most honoured members and contributors, among whom the names of Hodgson, J. D. Cunningham, J. Abbott, Cantor and Kittoe, are entitled to conspicuous mention. New writers of brilliant promise have come forward in numerous departments. The sister Institution of Delhi, founded within the year, has ably seconded their efforts by contributions, which have much increased the value of the Journal. The new year is thus opened under every favourable omen,—the fulfilment of which seems certain, by perseverance in the course which has led to the results now reported for the information of the Society.

(Signed) W. B. O'SHAUGHNESSY,
 Senior Secretary.

The Report having been read, Mr. Wm. Grey said he had reason to believe that the Senior Secretary had omitted a paragraph which the Council had requested to be added to the Report, and he moved that the paragraph be read.

Capt. Thuillier having seconded the motion,

Dr. O'Shaughnessy explained that he had received the paragraph in question, for which he felt most grateful to the Council of the Society, but he begged to be permitted to reserve it as a private testimonial, and not to publish it with the Report.

Minute on the Oriental Publications of the Asiatic Society.

About ten years have elapsed since the Hon'ble Court of Directors granted a munificent and ample allowance to the Asiatic Society, for the publication of standard Oriental Works; leaving to the Society, to a considerable extent, the free exercise of its discretion, both in the selection of such works and in the mode of publication. How ill the Society has responded to this expression of confidence, is a matter of painful consciousness to us all, and need not be further discussed on the present occasion. But as the strongest possible incentive to the adoption of some well considered plan of operation for the future, I

may briefly remind the Council that the result of the last ten years' means and opportunities amounts to the publication of the 4th Volume and the Index of the Mahabhárat,—the Shuraya-ul-Islam,—the Istillihat Sufeyah,—and the Tawarikh i Nadiri,—(each consisting of one volume); unless indeed in addition to these we claim the very questionable merit of having patronized from the Oriental Fund, sundry other works undertaken on private speculation.

The Society at the beginning of the present year, feeling very sensibly its past neglect, adopted stringent measures to prevent the future misapplication of this Fund; and in compliance with the understood wishes of the Court of Directors, resolved to commence immediately the publication of the Vedas. This important work was accordingly entrusted to the management of Dr. Roer, with every prospect of its being conducted in a manner creditable alike to himself and to the Society, under whose auspices he laboured. But scarcely had some little progress been made, when the views of the Society were frustrated by the recent resolution of the Hon'ble Court to publish these venerable works in England under the superintendence of Professor Wilson and Dr. Max. Muller! So that at the end of a year since the Society bestirred itself to redeem its lost time, and after many months of unwearied exertion on the part of Dr. Roer, our gratuitous, but able and willing labourer in the field assigned him, we find ourselves no further advanced than before, and more than ever liable to the withdrawal of the grant so long continued under circumstances but little calculated to elicit the approbation of the munificent donors.

Under these circumstances, and especially at the present season, when our arrangements are about to undergo revision at the annual meeting, I beg leave, with great deference, to lay before the Council a plan for the publication of Oriental works in future, which after much consideration, and much discussion with parties well qualified to form an opinion, I am inclined to think will prove the best means of accomplishing the objects for which the Grant was originally bestowed. My proposition is briefly this: That the Government grant, instead of being allowed to lie any time idle and accumulate, should be expended *monthly*, in the regular publication of a fasciculus, or livraison, consisting of the whole or a portion of some Oriental Work, printed uniformly with the Journal, to which indeed it would form a most appropriate supplement or com-

panion. By the adoption of this measure, there is every reason to believe that a great impulse would be given to the cause of Oriental Literature, and that much more might be accomplished towards the fulfilment of the wishes of the Hon'ble Court, than by more casual and desultory labours, resulting in the publication, at distant intervals, of ponderous and ostentatious tomes, such as now encumber our shelves. A work like that now proposed would soon become an indispensable appendage to every Library of any pretensions; and would be in large demand as well here as in Europe, if each text be accompanied, as I propose, it should be, by an English version, making it accessible to the many accomplished and earnest investigators of the Literature, History, and Archaeology of India, to whom the original is a sealed book.

To carry out this project, there would be required (besides the *hearty* and *effective* co-operation of the Committee and of Oriental scholars generally) a *paid* and *responsible* Editor, with an adequate native staff, acting under the immediate controul and direction of the Oriental Section, itself subordinate to the Council of the Society. For this purpose the fund appears very ample. A monthly number, consisting of from 80 to 100 pp. at a cost of say 2 Rs. per page for 500 copies, would amount to Rs. 200, leaving a surplus of Rs. 300 for the remuneration of the Editor, and his native assistants, the purchase or transcription of MSS., and the formation of a reserved fund, to be set apart for such other purposes in connection with the objects of the grant as the Society may hereafter see fit to promote; it being no part of the present plan that the *whole* grant should be expended in the way suggested; at all events till experience shall have proved the propriety of doing so.

As to the class of works to be published in the manner indicated, it were presumptuous in me to do more than allude to the subject. That portion of Dr. Roer's edition of the *Rig Veda*, now ready, would occupy about four numbers of the proposed work; the *Lalitá Vistárd*,* (an account of the life and esoteric doctrines of Buddha) would be an

* Our able librarian, Babu Rajendralal Mittra, undertook an edition of this work some months ago at my suggestion, and has, I believe, made some progress in it. The only copy of this work in Calcutta was supplied by Mr. B. H. Hodgson, who with his usual liberality and zeal has kindly sent to Nepal for other copies, to enable us to rectify the text by collation.

interesting work to follow ; or some of the *Bramanas*, or *Upanishads*. But I would not confine our attention *exclusively* to Sanskrit literature, though it should, for manifest reasons, form our *principal* staple. Arabic and Persian works of *Indian* interest would be welcome to a large body of our members ; though the more *general* literature of these languages might be safely left to the care of European scholars, or of such Muhammadan Governments as seem both able and willing for the task.* There are works in Pali which would come within the scope of the proposed publication as occasion offered : nor is Burmese literature devoid of interest ; as witness the *Dhamathat*, or Burmese "Laws of Menu," recently (but owing to the translator's death, very unsatisfactorily) published at Maulmein. Still the literature of the great family of nations subject to the government of the munificent bestowers of this grant, would of course form the object of our peculiar and grateful attention. On this part of the subject I shall venture no further however ; if the proposed plan meet the approbation of the Council generally, the details will receive the consideration of gentlemen immeasurably more competent to the task than myself.

I may observe in conclusion, that among the advantages of the proposed arrangement, we should always be *progressing* : interest would thus be kept alive to our efforts, and we might expect very important assistance from quarters whence it is impossible to derive it at present. Many of our countrymen scattered in remote parts of India would come forward to our aid, and as there is every reason to believe that many valuable works exist in the libraries of native Princes, these through their instrumentality might be rescued from obscurity and neglect.

Another very important advantage of this mode of publication would consist in the opportunity it would afford of availing ourselves from time to time of the suggestions of distinguished Orientalists, and improving the work as it advanced. In short, I have little doubt that the proposed mode of applying the Government grant would give an impulse to the cause of Oriental literature similar in kind to that given to other branches of the Society's pursuits, by the publication of its

* Many Arabic works are published at Cairo : at Constantinople, chiefly translations in Turkish.

papers in the convenient form of the monthly Journal, instead of that of the Researches.

I may add that nearly half a century ago a somewhat similar project was entertained by the Society, when it was resolved to publish, when means admitted, a '*Bibliotheca Asiatica*,'^{*} consisting of select Oriental works. We now possess the *means*, and if properly applied, these will enable us to accomplish with the utmost facility here, what is attended with infinite labour and difficulty to the persevering scholars of Europe, and in the course of a few years, to amass a body of Indian Literature which cannot fail to reflect the highest credit upon the Society with whose name it would be associated.

J. W. LAIDLAW,

Co-Secretary.

* 'Indica' would perhaps be a better name in the present case.

Dr. *Memo. of Account of the Asiatic Society, from 1st to 16th November, 1846.* Cr.

RECEIPTS.	DISBURSEMENTS.
To ORIENTAL PUBLICATIONS :—	By SECRETARY'S OFFICE :—
Received from Baboo Raj Krishna Mitter, Offg. Librarian, for sale of Oriental Works, Rs. 41 0 0	Paid Establishment and Contingencies for Oct. 1847, .. 118 14 6
To CONTRIBUTIONS :—	By MISCELLANEOUS :
Received from R. Houston, Esq., subscription per bill No. 2678, 16 0 0	Paid Discount on Government Allowance bills from July to October 1847, 4 5 6
	—————
	57 0 0
	123 4 0
To Balance as per account closed and rendered by Mr. W. H. Bolst, on the 31st October 1846, 1,004 15 2	By Balance in favor of the Society, 938 11 2
	—————
	Co.'s Rs. 1,061 15 2
	—————
	E. E.

Calcutta, 16th November, 1846.

N. B. Balance as per Cash Book kept by Mr. Bolst, is Co.'s Rs. 1,309 12 9

Dr. * *Abstract Statement of Receipts and Disbursements of the*

RECEIPTS.

To MUSEUM.

Received from the General Treasury, being the allowance authorized by the Honorable The Court of Directors for the services of a Curator, for October and November, 1846, at 250 Rs. per month, .. Rs. 500 0 0
 Ditto ditto for preparation of Specimens for ditto at 50 Rs. per month, 100 0 0 600 0 0

To MUSEUM ECONOMIC GEOLOGY.

Received from the General Treasury, being the allowance granted by Government for the services of a Joint Curator, for October and November, 1846, at 250 Rs. per month, 500 0 0
 Ditto ditto for Establishment and contingencies for ditto, at 64 Rs. per ditto, 128 0 0 628 0 0

To LIBRARY.

Received by Sale of Books, 3 6 6 3 6 6

To ORIENTAL PUBLICATIONS.

Received from the General Treasury, being the amount of monthly allowance granted by Government for October and November, 1846, at 500 Rs. per month, 1,000 0 0
 Received by sale of Oriental Works, 65 0 0 1,065 0 0

Carried over, 2,296 6 6

Asiatic Society from 16th Nov. to 31st Dec. 1846.

Cr.

DISBURSEMENTS.

BY MUSEUM.

Paid Mr. E. Blyth's salary as Curator for October and November, 1846, at 250 Rs. per month,	500	0	0
Paid his allowance for house rent from January to November, 1846, at 40 Rs. per month,	440	0	0
Paid Establishment of Taxidermists, Artists, Carpenters, &c., for October and November 1846,.....	279	8	0
Paid Contingencies for October, November and December, 1846,.....	196	5	3
Paid Messrs. Currie and Co. for Teak Wood Tables, Shelves, &c. &c.	425	14	0
			1,841 11 3

BY MUSEUM ECONOMIC GEOLOGY.

Paid Mr. H. Piddington's Salary as Joint-Curator for October and November, 1846, at 250 per mon'h, ..	500	0	0
Paid Establishment for October and November, 1846, at 31 Rs. per month,	62	0	0
Paid Mr. H. Piddington advance on account of 4 cases sanctioned by Government,	80	0	0
Deduct Balance of Cash in his hands—account contingencies,	1	2	2
	75	13	10
			637 13 10

BY LIBRARY.

Paid Babu Raj Krishna Mitter his Salary as Officiating Librarian, from 1st October to 4th November, 1846 at 80 Rs. per month,	90	10	8
Paid Babu Rajendralall Mittra's Salary as Assistant Secretary and Librarian, from 5th to 30th November, 1846, at 100 Rs. per month,	86	10	8
Paid Mr. J. Tucker as Assistant Librarian, from 1st to 21st October, 1846, when his services were dispensed with,	28	0	0
Paid Establishment for October and November, 1846, at 52-8 per month,	105	0	0
Paid Contingencies for ditto ditto.	19	11	3
Paid for Binding Books,	27	4	0
Paid Messrs. Thacker and Co., and Ostell and Lepage, for Books purchased,	129	4	0
			486 8 7

BY ORIENTAL PUBLICATIONS.

Paid Establishment for Oriental Works for October and November 1846,	136	0	0
Paid Moulivee for Copying the Arabic Work Nuharuck Phaak Sharah Kunzoot Doockaak for November 1846,	4	0	0
Paid Persian Writer's Salary,	6	0	0
			146 0 0
Carried over,	3,112	1	8

Report.

Brought forward, Co.'s Rs. 2,296 6 6

To CONTRIBUTIONS AND ADMISSION FEES.

Received from Members from 16th November to 31st December, 1846,	336 0 0	<hr/>	336 0 0
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To COMPANY'S PAPER.

Received by sale of the following 5 per Cent. Government Promissory Notes—

No. 1576 of 1829-30 for Sa. Rs. 1,500, Nett Co.'s Rs. 1,605 10 6	<hr/>
No. 1421 of 1829-30 for ditto, 2,500 ditto ditto.... 2,693 5 0	<hr/>
No. 3743 of 1207 of 1841-42, for Co.'s Rs. 5,000 do. 5,116 10 8	<hr/>
	9,415 10 2

To BALANCE.

Received from the late Accountant, Mr. W. H. Bolst, the amount balance of Cash in his hands as per account closed on the 16th November, 1846, and deposited in the Bank of Bengal,..... 1,309 12 9	<hr/>	1,309 12 9
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Company's Rupees,..... 13,357 13 5

Calcutta, Asiatic Society's Rooms,, }
the 31st December, 1846. }

E. and

Report.

xxv

Brought forward, Co.'s Rs. 3,112 1 . 8

BY SECRETARY'S OFFICE.

Paid Mr. H. Piddington, as Sub-Secretary, arrears of his Salary in full,	200	0	0
Paid Mr. J. Muller's Salary as accountant for 15 days of November 1846, at 60 Rs. per month, ..	30	0	0
Paid Establishment for November 1846,.....	20	10	0
Paid sundry petty expenses 1-4, Postage 2-12,	4	0	0
Paid for Stationery,	17	12	9
Paid for binding Books,	6	8	0
			278 14 9

BY JOURNAL.

Paid Rev. J. Thomas, Baptist Mission Press, for printing charges down to July, 1846,	418	0	0
Paid Messrs. P. S. De Rozario and Co. for Lithographing 525 Copies of a Drawing,	18	0	0
Paid Rev. A. W. Street, Bursar, Bishop's College, for printing charges in full of his account,.....	5,804	7	0
			6,240 7 0

BY MISCELLANEOUS.

Paid Agent to the Agra Bank Interest on a Bill for Co.'s Rs. 1,368 8 9 on account Portrait of W. W. Bird, Esq.	1	14	3
Paid Rev. A. W. Street sundry printing charges,	63	4	0
Paid for renewing two pieces of Company's Papers. ..	2	0	0
Paid for Sundries on account meeting of the 2nd December 1846,	5	10	6
Paid Messrs. P. S. De Rozario and Co. for Lithographing 500 Copies of a Circular,	15	0	0
			87 12 9

BY PORTRAIT OF HONORABLE W. W. BIRD, ESQ.

Paid J. R. Neilson, Esq. Agent Agra and United Service Bank, per Messrs. W. H. Allen and Co. Draft at 30 days sight,	1,368	8	9
			1,368 8 9

BY BALANCE.

In the Bank of Bengal,.....	2,037	15	0
Cash in hand,.....	232	1	6
			2,270 0 6

Company's Rupees,..... 13,357 13

O. E.

FRED. GREENWAY,
Officiating Accountant.

Report.

Dr.

Abstract Statement of Cash Receipts and

RECEIPTS.

To MUSEUM.

Received from the General Treasury the amount of allowance authorized by the Court of Directors for the services of a Curator for 12 months, at 250 Rs. per month,	Rs. 3,000 0 0
Ditto for preparation of specimens at 50 ditto	600 0 0
Received by fines,	6 7 9
Received by sale of empty bottles,	3 0 6
	<hr/> 3,609 8 3

To MUSEUM ECONOMIC GEOLOGY.

Received from the General Treasury, the amount of allowance granted by Government for the services of a Joint-Curator for 12 months, at 250 Rs. per month,	Rs. 3,000 0 0
Ditto ditto for Establishment and contingencies for ditto, at 64 Rs. per ditto,	768 0 0
Ditto ditto for four Glass Cases,	296 0 0
	<hr/> 4,064 0 0

To LIBRARY.

Received by Sale of Books,	236 0 0
Received fine from Frash's Salary, .	0 8 0
Received by sale of a Packing Case,.	6 0 0
	<hr/> 242 8 0

To ORIENTAL PUBLICATIONS.

Received from the General Treasury the amount of Grant from Government for 12 months, at 500 Rs. per month,.....	Rs. 6,000 0 0
Received by sale of Oriental Works,	500 8 0
Received from the General Treasury anticipated Interest on a new 5 per Cent. Loan for Co.'s Rs. 1,500, from 29th January to 29th June 1847,	31 7 4
Ditto 1,000, from 27th to 30th December 1847, at 5 per Cent.....	0 6 8
	<hr/> 6,532 6 0

Carried over, 14,148 6 3

Disbursements of the Asiatic Society, for the year 1847.

Cr.

DISBURSEMENTS.

By MUSEUM.

Paid Mr. E. Blyth's Salary as Curator for 12 months, at 250 Rs. per month,	3,000	0	0
Ditto house-rent at 40 Rs. per ditto, ..	480	0	0
Ditto in full of the arrears of his Salary from 1st May 1844 to October, 1846,			
at 100 Rs. per month,	3,200	0	0
	6,680	0	0
Paid Establishment of Taxidermists, Artists, Carpen- ters, &c., for 12 months,	1,750	0	0
Paid Contingencies,	793	7	3
Paid Mr. Holquett for proceeding to Dargaeeling,	70	0	0
Paid for a Glass Case for depositing Shells,	70	7	6
	9,363	14	9

By MUSEUM ECONOMIC GEOLOGY.

Paid Mr. H. Piddington's Salary as Joint-Curator for 12 months, at 250 Rs. per month,	3,000	0	0
Paid Establishment for ditto at 31 Rs. per ditto,	372	0	0
Paid Contingencies for ditto,	149	13	0
Paid for 4 Glass Cases granted by Go- vernment for the use of the Museum, 296 0 0			
Less paid on the 24th November, 1846, 80 0 0			
	216	0	0
			3,737 13 0

By LIBRARY.

Paid Babu Rajendra Lall Mitter's Salary as Assistant Secretary and Librarian for 12 months, at 100 Rs. per month,.....	1,200	0	0
Paid Establishment for ditto,	702	13	10
Paid Contingencies for ditto,	88	10	0
Paid Messrs. Thacker and Co., and Ostell and Lepage, &c., for purchase of Books,	772	6	0
Paid Freight and sundry charges on Books, Parcels, &c.,.....	73	15	0
Paid for binding Books,	133	6	6
Paid for 2 dozen of Toon Wood Chairs,	45	0	0
			3,016 3 4

BY ORIENTAL PUBLICATIONS.

Paid Establishment for Oriental Works for 12 months,	849	1	7
Paid Contingencies,	5	12	3
Paid Dr. J. Hæberlin, for 100 Copies of Sanscrit Anthology,	800	0	0
Paid for the purchase of sundry Oriental Works,	125	0	0
Paid for Copying the Arabic Work Naharal Phaik, &c.	4	0	0
Paid for binding Oriental Works,	97	12	0
Paid for the purchase of the following new 5 per Cent. Government Loans :—			
No. 18878 for Co.'s Rs. 1,500,	1,500	0	0
No. 4140 of 22567 ditto, 500,	488	7	6
No. 19620 ditto, 1,000,	1,008	10	7
1 Piece ditto ditto, 1,000,	1,000	0	0
		8,007	2

Carried over. 5.878 11 11 16 117 15 1

Report.

Brought forward, 14,448 6 3

To JOURNAL.

Received by sale of the Asiatic Society's Journal,	404	8	0
Received from the Bank of Bengal per a cheque on ac- count Journal,	400	0	0
			804 8

To COMPANY'S PAPER.

Received by sale of the following 5 per Cent Government Loans :—

No. 1208, dated 30th June, 1841, for Co.'s Rs.	1,800	0	0
No. 3744 of 1207, ditto ditto	2,000	0	0
	3,800	0	0

Interest from 30th June to 14th July 1847, being 15 days, at 5 per Cent...	7	14	8
	3,807	14	8

Less Discount on Rs. 3,807 14 8, at 2.4 per Cent.	85	10	9
	3,722	3	9
	3,722	3	9

Carried over, 18,975 2 0

	Brought forward,	5,878	11	11	16,117	15	1
Paid fee for renewing 1 Piece Company's Paper,		1	0	0			
Paid Dr. E. Roer, Co-Secretary Oriental Department, his Establishment and Contingencies for the publication of the Vedas for 7 months,		330	9	1			
Paid to the Sub-Treasurer for 2 Drafts on the Collector of Benares in favour of G. Nicholls, Esq., Head Master Benares College, being the amount disbursed by him on account of the publication of the Vedas,		119	9	0			
					6,329	14	0

By JOURNAL.

Paid Mr. J. C. Sheriff, account Bishop's College Press, for printing the Society's Journal, down to May, 1846,.....	1,078	4	0
Paid Mr. J. Thomas, acct. Baptist Mission Press, from September 1846, down to June 1847,.....	1,788	0	0
Paid Mr. Thomas Black, for Lithographing and printing,	775	11	1
Paid Mr. J. Bennett, for printing and coloring Drawings,	262	0	0
Paid Mr. J. Hume, Proprietor Star Press, for Lithographing, &c.	76	6	0
Paid Mahindri Sircar, for Lithographing, &c.	70	14	0
Paid Mr. J. Hendrie, for coloring Drawings,.....	111	0	0
Paid Contingencies,	62	2	3
			1,224

By MISCELLANEOUS.

Paid James Broderick's Salary as Night Guard for 26 days of November and for December, 1846, at 40 Rs. per month,	74	10	9
Paid Mr. Halligan, ditto for 21 days of July, 1847.....	28	0	0
Ditto from February to November, 1847, ditto,	400	0	0
	502	10	9
Paid Salaries of 2 Chowkeedars, &c., from the 10th to the 30th November, 1846,	10	1	3
Paid for a Canvas Screen,.....	12	3	0
Paid Mr. J. Muller, for a set of Bills of Exchange on Messrs. Sinclair, Hamilton and Co. London, in favor of W. Neal, Esq., Collector Oriental Translation Fund, at 30 ds. for £10 10 0, being the amount of Subscription for the year 1846,.....	112	0	0
Paid for Advertizing Meeting in the <i>Englishman</i> newspaper,.....	3	0	0
Paid sundry Contingent expenses incurred for the Meetings, and Oil for Night Guard, &c.	95	2	0
Paid for 10 Pieces of Gurra Cloth for the Committee Room,	15	0	0
Paid Mr. J. Chaunce, winding and keeping the Clock in order,.....	25	0	0
Paid Proprietor <i>Englishman</i> Press, for Lithographing 200 copies of a Circular,	11	8	0
Paid Messrs. P. S. De Rozario and Co., for printing 1,500 Receipts and 1,000 Bill Heads,.....	75	0	0
Carried over,	861	9	0 26,672 2 5

Report.

Brought forward, 18,975 2 0

To CONTRIBUTIONS AND ADMISSION FEES,	
Received from Members during the twelve months, ..	9,601 13 6
Deduct amount of admission fee, refunded to Messrs.	
Mackintyre and Co., on account Captain J. D. Cunningham, being received twice,.....	32 0 0
	—————
	9,569 13

To BALANCE	
As per Account closed on the 31st December, 1846,..	2,270 0 6

Company's Rupees,....	30,815 0 0
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E. and
*Calcutta, Asiatic Society's Rooms, 1
the 31st December, 1847.*

Report.

xxxi

	Brought forward,	861	9	0	26,672	2	5
Paid Advertising charges,.....		3	0	0			
Paid Discount on a Treasury Draft,		0	1	5			
					864	10	5

BY SECRETARY'S OFFICE.

Paid Mr. J. Muller, accountant, his Salary from December, 1846, to September, 1847, at 60 Rs. per month,	600	0	0
Paid Mr. F. Greenway, Officiating Accountant, his Salary for October and November, 1847, at ditto,	120	0	0
	720	0	0
Paid Establishment for 12 months,	391	9	3
Paid for Stationery, and a Stationery Case for Secretary's use,	53	4	6
Paid Contingencies,	90	11	3
	1,255	9	0

BY BUILDINGS.

Paid Workmen for repairing Bearer's Lodging,	3	0	0
	3	0	0
By MINERALOGICAL AND GEOLOGICAL MUSEUM.			
Paid Contingencies for 12 mouths,	41	9	9
Paid Cart hire for Minerals forwarded by Col. J. R. Ouseley, Chota Nagpoor,	12	0	0
Paid for 1 Second hand Glass Case,.....	14	1	6
	67	11	3

BY THE HONORABLE THE COURT OF DIRECTORS.
Paid for Casks and packing Cases for Specimens,

Paid for Casks and packing Cases for Specimens,	18	0	0
	18	0	0

BY PROTRAIT OF H. T. PRINSEPP Esq.

Paid Messrs. Lyall Matheson and Co., freight for a Case from London, addressed "H. T. Prinsep's Testimonial,"	20	0	0
	20	0	0

BY SIR A. BURNES' DRAWINGS.

Paid Mrs. A. M. Ballin, for printing and coloring Drawings,	1,001	15	0
	1,001	15	0

29,903 0 1

BY BALANCE.

In the Bank of Bengal,.....	682	14	6
Cash in hand,.....	179	1	5
	861	15	11

BY INEFFICIENT BALANCE.

For amount advanced Mr. Templeton, on the 7th instant on a petty charges in the Museum and Zoology Department,.....	50	0	0
	911	15	11

Company's Rupees,.... 30,815 0 0

and O. E.

FRED. GREENWAY,
Officiating Accountant.

Dr.

The Oriental Publication Grant in

Jan. 7th, 1847.—To Cash paid Establishment for Oriental Works for Dec. 1846,	66	6	4	
Ditto ditto Petty charges for ditto,	4	15	6	
				71 5 10
Ditto 29th ditto ditto G. Udney, Esq. Sub-Treasurer as Contribution for a new 5 per cent. Government Loan No. 18878 of 1841-42 dated 30th June 1841, for Co.'s Rs.				1,500 0 0
				1,571 5 10
February 3d ditto ditto Moulvie Golam Hydur for the following Books purchased from him :				
4 Vol. Sahnannah at 10 per vol.	40	0	0	
4 " Gunghoohee at 6-8 ditto,	26	0	0	
4 " Arbee Akhnwan Oossuffa at 5 ditto,	20	0	0	
4 " Oordoo ditto at 6 per vol.	24	0	0	
				110 0 0
Ditto 12th ditto ditto Dr. J. Hæberlin, for 100 copies of Sanscrit Anthology,				800 0 0
Ditto 15th ditto ditto Establishment for Oriental Works for January 1847,				62 0 0
				972 0 0
March 13th ditto ditto Duftry for binding 2 vols. Panini Grammar,	1	8	0	
Ditto ditto Establishment for Oriental Works for February 1847,	69	2	3	
				70 10 3
				70 10 3
April 14th ditto ditto Establishment for Oriental Works for March 1847,				72 0 0
Ditto 17th ditto ditto Duftry for binding Oriental Works,				7 12 0
Ditto 29th ditto ditto for copying the Arabic Work Naharal Phaik, &c.				4 0 0
				83 12 0
May 10th ditto ditto for the purchase of a copy of the first 4 Books of the Yajur Vedo Brashmana,				12 0 0
Ditto 12th ditto ditto Sheriet Woollah Duftry for binding Oriental Works,				3 0 0
Ditto 21st ditto ditto Establishment for Oriental Works for April 1847,				75 9 0
				90 9 0
June 8th ditto ditto for the purchase of a new 5 per Cent. Loan No. 4140 of 22567 for Co.'s Rs.	500	0	0	
Less Anticipated Interest from 8th to 29th June 1847 being 22 ds. at 5 per Cent.	1	8	6	
Discount at 2 per Cent.	10	0	0	11 8 6
				488
Ditto 11th ditto ditto fee for renewing Co.'s Paper, No. 4140 of 22567,				1 0 0
Ditto 16th ditto ditto Dr. E. Roer Co-Secretary Oriental Department salary of 2 Pundits from 10th to 31st May 1847, employed for the publication of Vedas,..	24	13	7	
Ditto ditto Stationary for ditto,	9	11	6	34 9 1

Carried over, 524 0 7 2,788 5 1

Account Current with the Asiatic Society.

By Cash received from the Sub-Treasurer the amount of Monthly grant sanctioned by the Court of Direc- tors, from November 1846 to October 1847, being 12 Months @ 500 per Month,.....	6,000 0 0	6,000 0 0
Ditto ditto Anticipated interest on a new 5 per Cent. Loan No. 18878 of 1841-42 for Co.'s Rs. 1,500 from 29th January 1846, 29th June 1847, @ 5 per Cent.	31 7 4	31 7 4

Carried over, 6,031 7 4

Report.

	Brought forward,	524	0	7	2,788
June 17th, 1847.—To Cash paid for binding 4 vols. Mahavarut,		24	0	0	
Ditto 19th ditto ditto Establishment for Oriental Works for May 1847,		72	0	0	
		720	0	7	
July 5th ditto ditto Dr. E. Roer, Co-Secretary Ori- ental Department, salary and Boat hire of 2 Pundits employed for the Publication of Vedas, for June 1847,		43	0	0	
Ditto 10th ditto ditto Sheriet Woollah Duftry for binding Oriental Works,		5	8	0	
Ditto 28th ditto ditto Establishment for Oriental Works for June 1847,		72	0	0	
		120	8	0	
August 7th ditto ditto Dr. E. Roer, Co-Secretary Ori- ental Department, salary of 2 Pundits, 1 Writer, and a Peon employed for the publication of Vedas, including Boat hire, for July,		52	0	0	
Ditto 19th ditto ditto Establishment for Oriental Works for July 1847,		72	0	0	
		124	0	0	
Sept. 6th ditto ditto Allum Duftry for Paper,		0	12	9	
Ditto 7th ditto ditto Dr. E. Roer, Co-Secretary Ori- ental Department, salary of 2 Pundits, 1 Writer, and a Peon employed for the Publication of the Vedas, and Boat hire for August 1847,		52	0	0	
Ditto 8th ditto ditto G. Udney, Esq. Sub- Treasurer, for a Draft on the Collector of Benares in favor of G. Nichols, Esq. Head Master, Benares College, being the amount of expenses incurred by him for the Publication of Rik Veda,	69	12	0		
Ditto ditto ditto Premium on ditto,	1	0	0		
		70	12	0	
Ditto 16th ditto ditto Premium for a new 5 per Cent Loan No. 19620 of 1841-42 dated 30th June 1841,	1000	0	0		
Interest from 30th June to 15th Sept. 1847 being 2 Months and 16 days at 5 per Cent.	10	8	11		
		1,010	8	11	
Less Discount at 3 as. per Cent,	1	14	4		
		1,008	10	7	
Ditto 18th ditto ditto Establishment for Oriental Works for August 1847,		72	0	0	
Ditto 27th ditto ditto G. Udney, Esq. Sub- Treasurer for a Draft on the Collector of Benares in favor of G. Nichols, Esq. Head Master Benares College, being the amount disbursed by him on Account of the Publication of Rik Veda,	47	13	0		
Ditto ditto Premium on ditto,	1	0	0		
		48	13	0	
		1,253	0	4	
Carried over, 4,905 14 0					

Report.

xxxxv

Brought forward, 6,031 7 4

Carried over, 6,031 7 4

	Brought forward,	4,905	14	0		
Oct. 1st, 1847.—To Cash paid Dr. E. Roer Co-Secretary Oriental Department Salary of 2 Pundits, 1 Writer, and a Peon employed for the Publication of Vedas, and contingent expenses, for September 1847,	53	0	0			
Ditto 6th ditto ditto Establishment for Oriental works for September 1847,	72	0	0			
Ditto 13th ditto ditto Sheret Woollah Dufry for binding Oriental Works,....	10	4	0			
Ditto ditto ditto Shabash Khan ditto,	6	0	0			
	16	4	0			
Ditto 30th ditto ditto for the purchase of a Copy of Betallee pchise,	3	0	0			
	111	1	0			
November 1st ditto Dr. E. Roer, Co-Secretary Oriental Department Salary of 2 Pundits, 1 Writer, and a Peon employed for the publication of the Vedas, for October 1847,	52	0	0			
Ditto 18th ditto ditto Establishment for Oriental Works for October 1847,	72	0	0			
Ditto 27th ditto ditto Dufry for binding Oriental Works,	39	12	0	163	12	0
	5,213	14	0			
To Balance Cash,	817	9	4			
Amount of the following new 5 per Cent. Government Loans purchased as above and deposited with the Government Agent.						
No. 18,878 of 1841-42,	1,500	0	0			
No. 4,140 of 22,567 of ditto,	500	0	0			
No. 19,620 of 1841-42,	1,000	0	0			
	3,000	0	0			
	3,817	9	4			
Co.'s Rs... .	9,031	7	4			
December 10th.—To Cash paid Dr. E. Roer, Co-Secretary Oriental Department Salary of 2 Pundits and 1 Peon and Boat hire for November,	44	0	0			
Ditto 15th ditto Establishment for Oriental Works for November,	72	0	0			
Ditto 27th ditto Sub-Treasurer, Contribution for a new 5 per Cent. Government Loan,	1,000	0	0			
	1,116	0	0			
Ditto 31st—To Balance.						
Company's Paper 5 per Cent. of 1841-52 for,	4,000	0	0			
Cash,	202	0	0			
	4,202	0	0			
Co.'s Rs... .	5,318	0	0			
E. E.						

Calcutta, Asiatic Society's Room, }
the 31st December 1847. }

	Brought forward,	6,031	7	4
By amount of 5 per Cent. Government Loans purchased during the year as per Contra,	3,000	0	0	
		3,000	0	0

Co.'s Rs... 9 031 7 4

Calcutta, 30th Nov. 1847.

December—By Balance brought down—

Company's Paper,	3,000	0	0
Cash,	817	9	4
	3,817	9	4

Ditto 15th ditto—Cash received from the General Treasury, amount of Monthly grant sanctioned by the Court of Directors, for Nov. 1847,

500 0 0

Ditto 28th ditto ditto anticipated interest on a 5 per Cent. loan for 1,000 Rs. from 27th to 30th December 1847,

0 6 8

Ditto 31st—By amount of a new 5 per Cent. Government loan as per Contra,

1,000 0 0

Co.'s Rs... 5,318 0 0

*Abstract Statement of Oriental and other Publications, &c., sold from
the 1st of December, 1846, to the 30th of November, 1847.*

Dr.

ORIENTAL PUBLICATIONS.

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III. 5 copies, Vol. IV. 7 copies, Vol. V. 7 copies, Vol.	
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JOURNAL.

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2 copies,.....	10 0 0

Carried over, 14 0 0 1,593 12 0

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Leech's Grammar of the Punjábi Languages, 2 copies,	2	0	0			
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				113	0	0
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Cr.

18th Dec. 1846, to 13th Augt. By Cash paid to J. Muller,						
Esq. Acct. Asiatic Society,	450	0	0			
17th Sept. to 22d Nov. 1847. Ditto ditto F. Greenway,						
Esq. Offg. Acct. As. Soc.....	467	8	0			
				917	8	0
By Outstanding Bills,	789	4	0			
Total,..... Co.'s Rs.	1,706	12	0			

E. E.

RAJENDRALAL MITTRA.

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JOURNAL
OF THE
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MARCH, 1848.

*Description of the Antiquities at Kálinjar.—By Lieut. F. MAISEY,
67th N. I.—Communicated by order of the HON. THE LIEUT.-GO-
VERNOR, N. W. P.*

In a Report on the 'Antiquities of Kálinjar' which I last year had the pleasure to forward to the Hon'ble the Lieutenant Governor, N. W. P., I mentioned my inability to enter into minute details, owing to my absence from the spot, and the want of notes at the time of drawing up the Report. I hope now to supply any past deficiencies, as the present paper has been entirely drawn up at Kálinjar itself.

I have already described the general situation and aspect of the Fort and I affix a rough plan of the same, in order to point out more clearly the sites of the various places mentioned. (Pl. VI. fig. 1.)

The Hill of Kálinjar, called also Rabichitr, from रघु, the Sun, was, beyond a doubt, devoted to Hindu worship long before the erection of the Fort, for not only are the dates of inscriptions at the caves, and on the various sculptures earlier than those on the gates of the Fort, but in many places the rampart walls are in a great measure built with fragments of ornamental pillars, cornices, &c. which probably at the erection of the Fort were the remains of Hindu fanes of remote antiquity.(1) These relics of forgotten buildings are seen in many situations which entirely preclude the idea of their having been so placed in

(1) This use of the fragments of buildings in the formation of the ramparts renders it difficult to assign the proper dates to them and the gateways. It will be seen that in several gates there is a variety of date and names.

mere repairs of the wall; moreover, it is very probable that the Fort was not built until the disturbance of the Hindu dynasties consequent on the Mahomedan invasion, when amid the constant wars and feuds, such an impregnable site would of course offer many advantages.(2) A date of the erection of the Fort is given in note 40; mention is made in "Dow" of a king of Kálinjar as early as A. D. 978, or Samvat 1035, but the earliest mention of a Fort is in the year 593 of the Higera, or A. D. 1205, Samvat 1262. As there are several objects of interest in the ascent it will perhaps be better to commence at the lowest gate and particularize each in succession.

The only ascent now(3) is on the northern face of the hill; it is defended by a loopholed wall and seven gateways, which, in accordance with the sacred character of the place, have been supposed typical of the seven planetary mansions through which the soul has to pass before its absorption into Brahm.(4) In Colonel Pogson's work on the Bundelas, an analogy is inferred between the seven gates of Kálinjar and the ladders erected in the caves devoted to the Mithratic rites, which ladders had seven portals, one above the other, either metalled or coloured to represent Saturn, Venus, Jupiter, Mercury, Mars, the

(2) The hill, which is between 700 and 800 feet high, is isolated, with the exception of a small offshoot at the eastern extremity, called Kálinjari (from whence the walls were battered by our artillery in 1804). The crest of the hill is perpendicular rock for an average of 50 feet, principally a natural precipice, but in some parts increased by scarping. The walls occupy the whole crest of the hill and in some parts the terrepleine of the rampart actually overhangs the precipice, as in Pl. IX. fig. 6. Wherever a shoulder or spur of the Hill might afford a lodgment to an assailant, a lower rampart or Fausse Braie is carried round, and encloses it, as seen at R. a. u. Pl. VI. fig. 1.

(3) There is another approach to the S. E. called the Pannáh or Bansákás gate (q. v.) but it is now blocked up.

(4) It is supposed that the Hindu worship had its origin in that of the Sun, which seems to have been almost universally adored as the emblem of the Creator; to which the moon was joined, in order to meet the human ideas of generative power. These celestial bodies were impersonated and other planets added as objects of worship. The common origin of the Hindu, Egyptian, Greek, Roman, Anglo-Saxon, &c. idolatry is at once apparent in the identity of the deities worshipped by different nations on the 7 days of the week, to which they give these names:—

Sol, Luna, Mars, Mercuriy, Jupiter, Venus and Saturn are the Suryá, Somá, Mangola, Budh, Vrihaspati, Sukrá and Shani or Sanichar of the Hindus, and the Sun, Moon, Tuisco Woden or Odin, Thor, Freya or Friga and Seater of our own ancestors. The Hindus make some of them of a different gender from the classical, but they appear to worship some both as male and female, as the ancient Egyptians did the moon, &c.

Moon and the Sun in successive order. But of course this is no place for long extracts, or volumes might be filled with accounts of the curious coincidences in the buildings and forms of worship of widely separated nations. In Pogson's small work there are several highly interesting extracts and notes on these subjects which will amply repay perusal. In reading a life of Inigo Jones, I was struck with the similarity between the seven-walled and seven-gated erections of the Hindus and others, and Stonehenge. According to his description, having been directed by king James to give his opinion of Stonehenge, he set to work digging, measuring and planning and subjecting it to the principles of architecture, and published an elaborate account of the whole.(5) The comparison of these various peculiarities is most curious and interesting; but I have already too long deferred the actual account of realities in the pursuit of theories.

The first gate is situated about 200 feet above the base of the hill, which is so far undefended. The gateway is of a modern appearance, and was probably entirely rebuilt at the date of the inscription, which is over it. It is defended by a loopholed bastion on each side, and a loopholed wall runs up the side of the hill at this and the other gates to prevent a passage round them. It is called the *Alam Darwaza*, from its founder, Aurangzeb, who took the name of *Alamgir*. The Persian inscription over it is given below.(6) It fixes the date at 1084 of

(5) According to his account, Stonehenge was a "Temple of the Tuscan order, raised by the Romans some time between Agricola and Constantine, and consecrated to the God *Cælus*, the origin of all things, because of the situation, the decorum of the structure, the pyramidal figures of the stones, and the nature of the sacrifices." From his careful investigations he was able to state that the building was composed of polygons within a circle consisting of three ranges of stones (the outer one circular and the two inner hexagonal) surrounding the principal edifice. There were three approaches with double gates at each range of stones, and the ground from the outer circle rising gradually to the centre on which stood the shrine, as it were.

This may be supposed to have been a temple of the sun and the six gates in each approach gradually rising over each other the moon and five lesser deities.

الله هو الغني

(6) شاہ اورنگ زیب دین پورو شد مرمت چون قلع کالنجر
چون محمد مراد از حکمیش ساخت درہا صحکم و خوشتو
از خردھال جستمیش میگفت مدد عظیم چو سد اسکندر

۱۹۷۴۶

the Higera. The numbers being shown under the letters مظہر سے according to their numerical value. There are strong wooden doors to this gateway. The ascent between the 1st and 2d gateways (called the Kafir Ghâti) is chiefly by steps (7) and very steep.

The second gateway is called by the brâhmans "Ganésh Darwâza;" it has no doors standing, but the sockets for the hinges and cross-bars in this and other gateways prove that originally there were doors to all (8) There are no inscriptions on this gateway, immediately beyond which is the 3d, or "Chandi Darwâza," at the angle of the hill. This in fact is a double gate, but the whole forms one building and goes by one name. This gate is also defended by the loopholed wall and bastion.

There are several inscriptions on the sides of this gateway, one given in facsimile* (No. 6) and the others below.(9) The inscription in facsimile is on a block of stone, which evidently has once formed part of some decorated building, for it is carved with foliage, &c., and quite out of keeping with the plain style of the gateway. Beyond this gateway is a modern looking building, seemingly a mere shelter for the defenders ; from this point the covered way is nearly level as far as the next gateway, before reaching which you observe a mass of rock on the right, which has apparently fallen from above ; on this there is what appears to be a rough Ling and also a Sanscrit inscription of 5 lines, containing the name of several pandits. The cavalier or barbette which commands the approach to the 4th gate, conceals a gateway which opens on a rough flight of steps leading by a short cut to the foot of the hill.(10) The 4th or Budh Budr gate, is of very solid construc-

(7) The entire ascent was evidently originally formed into steps, the traces of which are evident throughout, and in most parts they are still very perfect.

(8) On the right of this gate as you approach it there is a small coarse sculpture in relief, representing a seated Ganesh, about 18 inches high, from which probably the gate is named.

(9) Inscriptions at the 3rd or Chandi gate :—

(10) This gateway is reached by a path which winds round the barbette ; it has no doors,

سہیشکاہ پرائی مانو بھیجک سं ۱۵۰۷

بھوپال کاہ پرائی مانو بھیجک سं ۱۵۰۰

مہیشکاہ پرائی مانو بھیجک سं ۱۵۰۵

سہیشکاہ پرائی مانو بھیجک سं ۱۵۰۸

* See Appendix.—E.Ds.

tion ; it has only one inscription, which corresponds with that of Manu on the Chandi gate.(11) The 5th gate is called Hanumán Darwáza, and round it the wall of the covered way makes a sweep, forming a kind of "Place of Arms," in which is situated Hanumán Kund, a small pool of water enclosed by four walls, and reached by steps on one side. The wall next the hill is formed into two rows of three arches, the lower row almost covered by the water. A small barbette on the left as you come abreast of the gate supports a dismounted 6-pounder iron gun, of the same construction as those which will be shortly noticed. At the extremity of the place of arms a small postern in the wall leads on to a narrow irregular path running along the precipitous side of the hill to some dried up Kunds,(12) which however are mere hollows in the rock and not worth the trouble of visiting. The face of the rock between Hanumán Kund and the gateway, is covered with sculpture, but it is so defaced and obliterated as to be almost unintelligible. The subjects, as far as I could see, consist of figures of Mahádeo, Ganesh, Devi, the Bull Nandi(13), Ling, and figures of worshippers. The gate is in a very ruinous condition ; it has one or two inscriptions.(14) The steps

but the sockets remain as in the 2d gate ; stores, &c. are said to have been formerly brought by this path for the use of the garrison. The brâhmans call it the Balkandí Mahádeo Darwáza, from the image of that name which is found in the descent on which it opens. This image (the Balkandí Mahádeo) is situated about half way in the descent. There is a small building with a pyramidal roof formed of diagonal layers of stone. It gives cover to an image of Mahádeo as the Ling, 6 feet high. The building and image are given in plan and sec. in figs. 8, 9, 10, 11, plate 2. [A facsimile of this plate is deposited in the Society's Library.—Eds.] A banyan tree has grown in the most curious manner apparently through the building, and its roots are interlaced in the door as seen in fig. 9, the path of the descent runs round and partly above the mass of rock on which the dewala abuts over and on each side of the doorway there are several, small unimportant sculptures of Ganesha, Mahádeo, Pârbati, &c. and some other figures and Ling are seen on slabs of rock near, but they are not worth sketching.

(11) Inscriptions at 4th gate :—

महेश्वर प्रणसमनुवीक्षक सं १५८.

(12) There are no sculptures or inscriptions at any of these places ; on the right of the path leading to them is a small figure in the rock representing a "Sarmán" or water-carrier.

(13) Nandi, the vâhan or vehicle of Mahádeo, on which he rides, hence his name of Nandigan.

(14) On the left (ascending) **महेश्वर प्रणस मोखमनुकविरोनि अनिजापुनिते प्रते संवत् १५८०** on the right is an inscription with the name of Ganesh, dated १५८०.

of the ascent as seen in the plan, make a sharp turn at this gate, resuming the same direction beyond it. Passing through it you see a figure of Hanumán on a slab resting against the rock ; it is very badly executed ; he is represented in the act of striking with a club and holding a flower or fruit. One foot is on the prostrate figure of a demon : on the left of this figure is a small recess under a projection of the rock, containing five figures in relief, almost undistinguishable from whitewash.(15) The face of the rock between the Hanumán and 6th or Lál Darwáza, is lined with sculpture much obliterated, owing to its exposed situation ;(16) about half way between the two gates is another small recess called a Siddh ke guphá. There is a small door to it, on the left of which is a representation of Narsingha.(17) Inside the recess there is nothing but a fragment of a figure of Hanumán about 9 inches high. The 6th or Lál Darwáza, is in very good preservation, and has the wooden doors standing ; on the right is the inscription given below,(18) and on the left one dated संवत् १५८०.

Ascending to the top of this gateway you reach a pathway which leads along the face of the hill (*j G*) to the fausse braie, which contains Bhairon Kund.(19) This is an artificial tank about 45 yards long ; one side is formed by the rock, which is excavated roughly for a little distance, five square pillars and 4 or 5 pilasters being left as support. They are very coarse and unfinished ; I do not think there is any sculpture on them, or in the recess, but I cannot be sure, as there were no means of reaching the spot. The water appears to be shallow, and is reached by steps on the side of the tank. About 20 feet above the water there is a figure of Bhairon about 10 feet high, cut in the

(15) There is the dried up bed of a Kund here, which was originally called Hanumán Kund.

(16) The sculptures represent Káli, Chandika, Ling and Joni, &c. but there is nothing curious or uncommon among them ; there are several small inscriptions dated संवत् १५६० and १६०० containing the names of Manu and other workmen, probably the artists of the sculptures.

(17) Vishnu is here represented riding on a lion, which is rearing over the kneeling figure of Hiranyakasipa.

(18) संस्कृत प्रणम मनुबीजक संवत् १५८०.

(19) This may be reached also by ascending to the top of the Budh Budr gate, and scrambling over the rough slope formed by the broken wall.

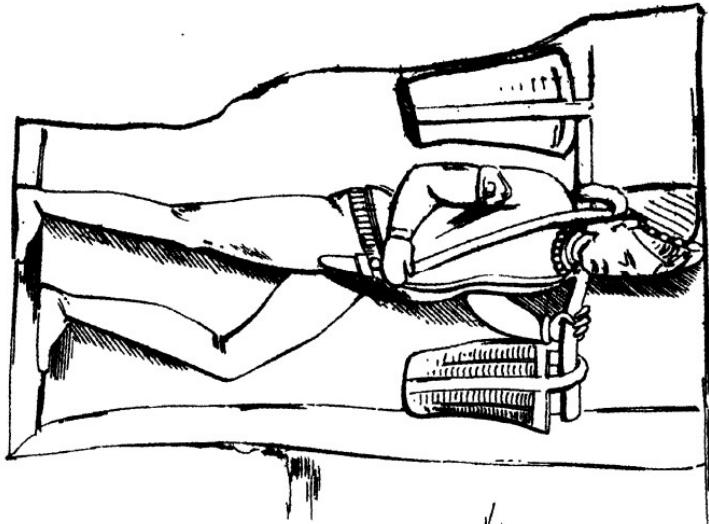
VII.

Fig. 4.



Mr. Major dell.

Fig. 3



solid rock. He is represented in the usual manner and attitude.(20) On the rock to the right of the tank are several Ling emblems of Mahádeo of various sizes, and on the left some male and female dancing figures and two sarmán or water-carriers, (vide Pl. VII. fig. 3.) near one of which is the inscription No. 12.*(21) Lying near Bhairon Kund is a stone trough or cistern 4 feet 9 inches long and 2 feet 5 inches wide, cut out of a solid piece.

From the Lál Darwáza a short ascent leads to the 7th or main gate, which is of a comparatively modern appearance and has probably been repaired at a later date than the others. There is an inscription on it dated Samvat 1691 or 2; it has large wooden doors. Inside the gate on the left are several detached sculptures of Mahádeo and Párbatí, Ling and Joni, impressions of feet, &c.(22)

As the various caves, kunds, &c. &c. are scattered about in different parts of the hill, it will perhaps save confusion if I mention them in the order in which they present themselves as you make the circuit of the ramparts, commencing on the left of the main gate.

The first objects which attract attention are two large iron guns lying on stone barbettes. There are fourteen of these guns in different

(20) The figure does not appear very well finished, and is moreover nearly hidden by the jungle which has been suffered to grow over it.

(21) The situation of this inscription prevented my making a facsimile of it, as I was obliged to cling to the rock with one hand while copying with the other, whereas to make a facsimile I must have used both hands. I believe the copy is correct of as much as was legible at all.

(22) The Joni, which is the name of the curious spouted pedestal on which the Ling stands, is the emblem of Párbatí, the female power of nature, as the Ling Mahádeo is of the male. Mr. Coleman says, " Of the origin of the mystic worship of the Linga and the Joni little appears to be understood. It may be presumed to have been nature, under the male and female forms personified as Siva, the Sun (which he is equally with Surya) or fire, the genial heat which pervades, generates and vivifies all : and Bhávani, who is the goddess of nature, is also the earth, the universal mother. These two active principles of life having been thus personified, may have been subsequently converted, by the grossness of idolatry, which in its progress invariably seeks rather to gratify the sensual appetites than to instruct the minds of its votaries, from imaginary forms to realities, from the personified symbols of nature to typical representations of the procreating power of these symbols themselves. The Joni is the symbol of female energy, worshipped by the sect of the Sáktas and in conjunction with the Linga by the Saivas ; it is the especial emblem of Párbatí. In representation of the Linga it forms the rim or ridge of Argha which encircles it."—Coleman, Myth. pp. 175, 176.

* See Appendix.

parts of the fort, consisting of 18, 12, 9, and 6 pounds. They are of very heavy metal and seem to be formed of iron bars confined by hoops of the same metal very firmly welded together ; most of them have a roughly carved design. They appear to have been mounted on pivots and swivels so as to embrace a large space in their range. The trunions are placed much as in our guns, and each of the stone barbettes has a socket in the centre, probably for the reception of the pivot on which the gun worked.

The gun nearest the gate has the following inscription :

दल्मरदनश्रीमहाराजधीराजश्रीमहाराजश्रीराजहीरदेसहुदेव

“ Dalmardan Srí Maháráj Dhíráj Srí Maháráj Srí Ráj Híradesa Hí-judeo.”(23) The Rájá Híradesa here mentioned, was, I believe, the son of the famous Chatarsal. A path leads past these guns down to the rampart, the terrepleine of which is lower than the gateway. There is a flight of steps for the purpose of ascending and descending, but it is choked up by jungle ; at a little distance from the gateway there is a fall in the level of the rampart of about 12 feet, and this is the site of the cave called “ Sítá-sej” or (Sítá’s bed) which is excavated under the upper, and opens on to the lower portion of the rampart. The plan and sections of this cave are shown in (MS.) Plate I.(24) It is entirely hewn in the solid rock, the marks of the chisel being apparent throughout ; the side opposite the entrance is occupied by a stone couch and pillow on which Sítá, the wife of Rámchandra, is supposed to have slept ; the roof is of very curious formation, being cut into vaulted shelves or cupboards on each side of the centre, vide fig. 3 P. P. These shelves occupy about half of the roof, O. R. fig. 2, and the remainder O. S. is plain.(25) The door, J, has plain pilasters on each side, and square holes, f f, above and below, seemingly for posts to bar up the entrance. There are several inscriptions on the stone bed, two of which are shown in facsimile ;(26) they are chiefly of

(23) There are inscriptions on two other guns which will be shortly mentioned ; they each contain the name of Rájá Híradesa, preceded by several expressions of respect, and the name of the gun.

(24) The bráhmans say that after the war in Lanka (Ceylon) consequent in the abduction of Sítá by Rávan, she, Sítá, came to Kálínjar and made this abode for herself. It is called also Rám Syan.

(25) These shelves are said to have been made as receptacles for the various articles of clothing and ornaments pertaining to Sítá, and there are also two niches in the sides of the cave for holding lamps.

(26) Nos. 7 and 10. See Appendix.

1600, and thereabout, but on the left of the cave (outside) near a small Ling in relief is a date of श १५००. On the right of the cave as you face it, there is a small recess under a projection of the rock, on which are some poorly executed male and female figures ; close to Sítá-sej is Sitákund, which is I think a natural reservoir, or at all events very little enlarged. It is a pool of clear water on a small cavity under shelving rocks, and is reached by two or three steps from the rampart. On the rock over the kund is a sitting figure about 2 feet high resting on one hand, and near it what seems to be a fish in a basket.(27) The water of this kund is much prized for bathing.

Beyond this point the rampart for a few yards is broken, and you ascend the hill a little in order to pass round the gap, immediately on the other side of which is the mouth of the curious descent to Pátál Gangá.(28) This a large cavern full of water, about 40 feet by 20 or 25 ; it is situated between 40 and 50 feet below the top of the hill, and the only access to it is by winding steps cut in the solid rock leading from the rampart almost perpendicularly down to the water, like a well in fact. The cave is rough and irregular, and probably in great measure natural, but the descent has evidently been carried through the rock, as the marks of the chisel pervade it throughout.(29) The entrance to the descent is under a large mass of rock which abuts on the rampart and the steps wind down very abruptly. They are very irregular, some being three feet and others not one foot high. About half way down there are two gaps on the left, through which a view is obtained of the bottom of the hill and the distant plain.(30) In the steps and

(27) Vide Pl. VII. fig. 4. The bráhmans call this a Chaukidár. Over the right shoulder of this figure is an illegible inscription, and over the basket some more much obliterated characters with the date १४८०.

(28) I fancy this name merely refers to the dark and subterraneous nature of the place. There is an account of Gangá having once descended into Pátál to rescue the 60,000 sons of King Sagara, but I do not see any affinity to that beyond in the place in question.

(29) It seems probable that this descent was formed down the course of some natural cleft or fissure, which was enlarged or built up as required ; the position of the cave containing the water could not otherwise have been ascertained, as there are no traces of it visible from the outside below.

(30) The winding descent has been here excavated so near the face of the hill that apparently the mere screen left has given way and formed this gate. A rough wall of stones has been built close in the passage at the lowest gap, and the whole has evidently at

rock overhead here and for some distance down there are square holes, evidently for the insertion of stone or wooden pillars to aid in supporting the weight of rock ; on the right of the descent, as you reach these apertures, is a date of 1540, and opposite to them is a small door 3 feet 7 inches by 3 feet, showing a shallow recess or niche, which probably originally contained an image. This door is guarded by a coarsely executed male figure in alto-relievo, standing on a couple of stools and resting on a staff. He is attended by a cow, apparently standing over a small Ling and Joni ;(31) under the figure is an inscription, dated १५४०, which is given in facsimile No. 8, and on the right door post, another dated १५२, (obl.) also in facsimile No. 9.(32) About 30 steps below this point there is another aperture in the screen of rock left by the excavation ; it is very small, being only just large enough to admit the passage of the body.(33)

From this opening a descent of 11 or 12 steps leads to the level of the water, which is about three feet from the roof. In order to see the nature of the cavern, I had chirághs lighted and floated to the further end ; the roof of the cave is rough, as is also as much of the bottom as is visible from the steps. The bráhmans would not wade far into it, as they said it is very deep in the centre. I have already stated that the cave is about 40 feet by 20 or 25 ; the roof is entirely unsupported, which makes me think that it is a natural cavity, very little if at all enlarged by art, for it is not probable that any workman would have left nearly 1000 square feet of rock unsupported by pillars. The water appears to be constantly dripping and trickling from the roof and sides.

one time been built up in this manner, as the traces of cement are visible all round the openings, so that the places originally must have been well worthy of its gloomy name.

(31) Vide Pl. VIII.

(32) The surface of the stone on which these are cut being very rough and worn, it was impossible to make a good facsimile.

(33) About 10 feet below this opening the face of the hill loses its perpendicular direction and slopes down abruptly ; there is an overgrown path along the foot of the precipice into which I let myself down, in order to ascertain whether there were any traces of the cave from the outside ; however I could discover none. On the rock here are several Persian inscriptions, one containing the name of Humáyun and date of Higera 936, which exactly corresponds with the date of the siege of Kálínjar by Humáyun given in Dow.

محمد همایون پادشاه غازی بنقاریخ سلطنه رجب المرحاب سنہ ۹۳۶

Mahammad Humáyun Pádsháh Gházi bátirikh salkh Rajab-ul-Murajab, Samvat 936.

Pl. VIII.



Lt. Maisey delt.

T. Black. Asiatic Lith. Press. Calcutta

(34) There is a glimmering light from the left which comes through crevices between the horizontal strata of the rock, which are not traceable from the outside. Proceeding along the rampart beyond Pátal Gangá, you see some rough steps on the left leading through and outside the wall on to a ledge of rock in which is situated Pándu Kund. The rampart here rests on a projecting rock, and the Kund, which is under it, is approached by a dark passage between the virgin rock and a wall built up to close in the passage, as seen in Pl. IX. fig. 6. There is no sculpture in this passage; the only objects in it being a small outline of a sarmán scratched in the rock, and a similar one of Bhagwán, near which is the inscription(35) shown below; above this there are traces of another inscription, and to the left the characters fig. 1, Pl. X. The kund is a shallow circular basin about 12 feet in diameter; the water is constantly trickling into it from between flat strata of rock and running over finds its way down the hill. There are six small Ling five inches high sculptured in the rock close to it; over the Kund is the inscription(36), and beyond it two others, one given in facsimile(11) and the other below(37). On the rock at the end of the space containing the kund are some curious characters(38). About 40 yards beyond the entrance to Pándu Kund is a flight of 3 or 4 steps leading into a low vault under the rampart, probably formerly used as a Magazine for powder, &c.

The next feature is a large breach at the N. E. angle, which was formed by our troops under Col. Martindell. In the broken walls may be seen a number of fragments of pillars, cornices, &c. The breach has been partially repaired, and the rampart wall is here 50 feet high. There are several pieces of sculpture and architectural decorations built up into the interior slope of the rampart here under some trees. They have all the appearance of having formed portions of

(34) The hill may be compared to a huge sponge, for you meet with kunds either full or dry, and water is seen oozing and dropping from it in hundreds of places; however, the structure of the hill is loose strata, and of course the water from the numerous tanks above percolates all over it and finds the nearest vents.

(35) मनेशुबवले करप्रस्तुमारा

(36) गोकरमसारथीम प्रवरकप यौपादन

(37) नरहरीमरधीत्र प्रश्नम परवनके

(38) We have given these in Pl. X. with their Roman equivalents as pencilled on the MS. by Capt. A. Cunningham.—Eds.

square pillars or pedestals(39). Some of the subjects are indecent and others represent various deities, dancing girls, &c.

Proceeding along the side *H I* you shortly arrive at a considerable drop in the level of the rampart caused by a hollow of the hill. The ground to your right here is high and dotted with several buildings. There are among them some tombs, and Ling chabutras, but the greater part are small plain dewalas, empty, with the exception of one, which contains two wretchedly executed sitting naked figures of Mahá-deo and Párbatí. These buildings are scattered about the banks of a tank called the Buddhi, Buddhá, or Burhiyá ke Taláo. This tank is about 50 yards by 25, and is excavated in the rock ; it has steps all round it ; bathing in it is said to be very beneficial to soul and body. This tank and the fort are said to have been constructed at the same period.(40)

A little beyond the hollow ground the rampart has given way and the fragments form a precarious descent to the slope of the hill below, along which is a tangled path, now seldom visited owing to the trouble of reaching it. This path conducts to a Siddh ke guphá, Bhagwán-sej and Pání ke Áman ; the Siddh ke guphá is merely a small excavation in the perpendicular rock formed for performing penance in ; there is a plan and section of it in (MS.) Pl. II. figs. 1 and 2 ;* in it I found the two pieces of stone containing the inscription given in facsimile No. 3.

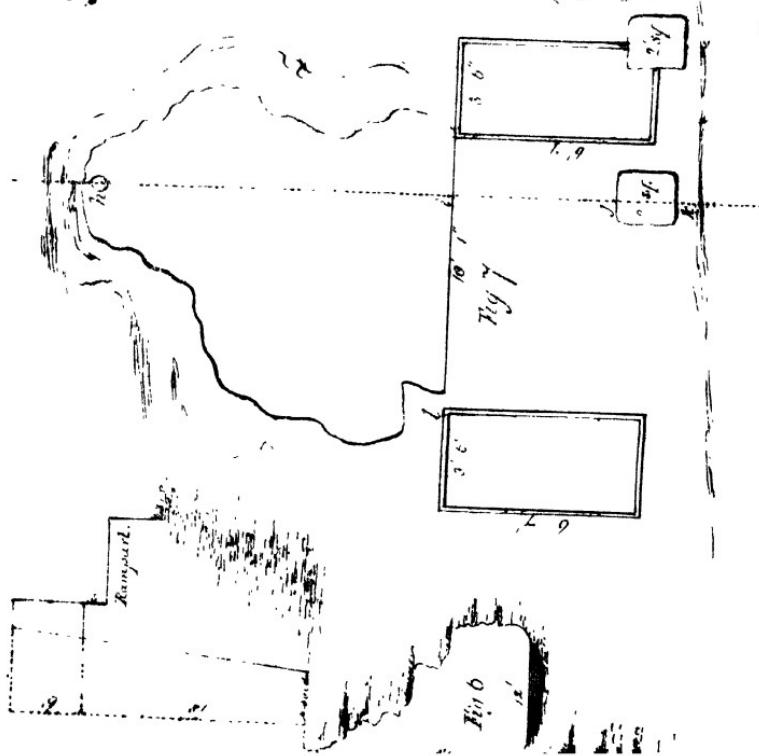
(39) A little beyond this point the bráhmans show you a spot at the foot of the rampart where there was formerly a large temple, to which probably these fragments pertain-ed. There are still traces of building visible, but it is impossible to guess at their nature or extent in consequence of the height from which you view them.—(Pl. VI. fig. 1. p.)

(40) According to the tradition of the bráhmans there was originally only a small spring here, the water of which possessed great virtues. It chanced that a réjá Kirat Brihm, surnamed Krim Khot, a leper, happened to visit Kálinjar, and hearing of the spring, bathed in it and was cured ; in gratitude for which he made the tank and built the Fort. The name of Krim Khot was probably only allusive to the disease ; Sanscrit क्रमि a worm, and खाल a blemish, or खटी a scab.—But Kirat Brihm is a real name of one of the latter Chandal Rájás, the immediate predecessor of Parmál Brihm, whose name is mentioned on the large inscription at Nílkáñth dated 1209 of the Samvat ; so that according to this account the date of the erection of the fort would be near the end of the twelfth century of the Samvat, making it a good deal upwards of 700 years old.

* The publication of all Lieut. Maisey's beautiful plans would involve so heavy an outlay that we have been compelled to omit several. These we have had traced on thin paper and deposited in the Society's Library. The references to these in Lieut. M.'s paper we have distinguished by the letters (MS.)—Eos.

Fig. 8

Scale of feet per fathoms
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



Bhagwán-sej is a stone couch and pillow similar to that in Sítá-sej, but smaller and cut under a projection of the rock, as shown in plan and section, figs. 3 and 4, (MS.) Plate II. Beyond this is the excavation called Páni ke Áman ; it is very low and entered by a small door about 2 feet 6 inches high ; the flat roof is supported by 3 or 4 pillars slightly decorated. The cave, or rather hole, is very small, and so low that you are forced to creep on hands and knees to examine it. There is no sculpture at these places. Re-ascending to the rampart and continuing the circuit of the fort you next reach the Pannáh or Bansakar gate, situated at an angle of the hill, which is guarded by a fausse braie. There are three gateways, one in the rampart (Pl. VI. v.), a second at the extremity of the fausse braie, and the third a little lower down ; the two latter are blocked up. There are several inscriptions on the right of the rampart gateway, three of which I have shown below.(41) Passing round to the left of the gateway and proceeding to the end of the enclosure, you find a choked up flight of steps opening on the ter- repleine of the rampart and leading to a gateway or postern, which formerly gave access to several places of worship, but it is now blocked up,(42) and to reach them you must descend the wall of the fausse braie by means of trees growing near it. The path at the foot of the wall runs in a scrambling up and down direction to the right and left ; pursuing the path leading towards the breach, and passing a small pool of water, called Bhairon ke Jhirya, you shortly reach a partially excavated kund under projecting masses of rock, which are supported by pillars (*vide* Pl. IX. fig. 7). On each side of the kund is a stone slab or bench. The only sculpture here is a figure in relief of a sarmán, and a small Ling at the extremity of the kund.(43) The bráhmans call this both Mahádeo and Bhairon kund. Sculptured in the rock, about 20 feet above this kund is a large naked figure of

(41) Inscriptions on the right of Pannáh gateway :

बसुदेव कह प्रणमु गणगरक्षनकगेपुष्टवासूपती संवत् १६००

महेशकह प्रणमु कवलतनकमीत प्रति संवत् १६००

on the right gate post :

महेश कह प्रणमु मोखमनुबीति अवोजोकनिल सं १५५०

(42) The path to the Siddh ke guphá, Bhagwán-sej, &c. already mentioned, was formerly through this postern.

(43) Over the Kund is the date संवत् ११८५, and on the right hand slab १६००.

Bhairon, to reach which you have to climb over steep and slippery masses of rock. The situation of the sculpture is curious ; it is sculptured in relief on the perpendicular rock with a small ledge about 2 feet wide immediately below it, which is the only standing room near it.(44) This figure is called the Minduke or Mirke Bhairon. He has ten arms, two supporting the rock and holding up some drapery stretched out like a curtain, probably the veil with which at the end of the world, he will hide the sun, thereby causing universal destruction. (45) His various hands hold respectively, a sword, a thunderbolt, (46) a head,(47) shield, trisul (trident), axe, club, ladu ;(48) an elephant is sculptured behind him, and he is attended also by his váhan or vehicle, a dog. He has a skull in his head-dress and a garland of them round him ; under the figure is the date 1432, १४३२ but under a small figure of a worshipper on the right, which appears part and parcel of the subject, is the date 1194 (Samvat) ११९४. The Bhairon must be 8 or 9 feet high. On the left are three standing figures with Ling and Joni between them. They consist of a male between two females ; the male figure holds two, and each female figure one, string of beads. On the right is a seated female figure(49) rather larger than life ; one hand is on her bosom, and she supports herself on the other. Her eyes are turned towards Bhairon ; she is seated on a kind of chárpaí, on which is an inscription with Manu's name, date १५५२. (50) There are also a figure of a sarmán, and a head of Mahádeo.

(44) On this account I am unable to give a drawing of it : however, it resembles in most respects the various other figures of Bhairon.

(45) One of the figures of Siva in the Elephanta cave is so represented.

(46) Hence Bhairon's name of Bajranga.

(47) The origin of the head represented in the hand of the destructive form of Siva is thus explained by Col. Vans Kennedy : during a quarrel between Siva and Brahma, the former in a rage cut off with his nail one of the 5 heads of the latter, who had originally 5, and was unable to loose it from his hand ; hence he is represented with one in his destructive capacity.

(48) Most of the figures of Bhairon at Kálinjar are attended by an Elephant, which he feeds with Ladu.

(49) Kálí, who with Siva, is the progenitor of Bhairon.

(50) Between the years 1550 and 1600 of the Samvat, there seem to have been extensive works carried on at Kálinjar. Manu Bijay seems to have been the principal architect and sculptor (vide notes 9, 11, 14, 16, 18,) probably at that date the Fort was thoroughly repaired as well as enriched with sculpture.

Fig. 1



Ma-no-ra-tha I

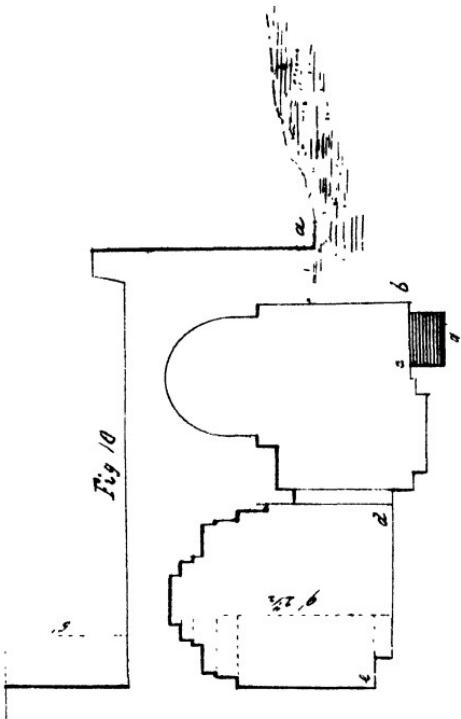
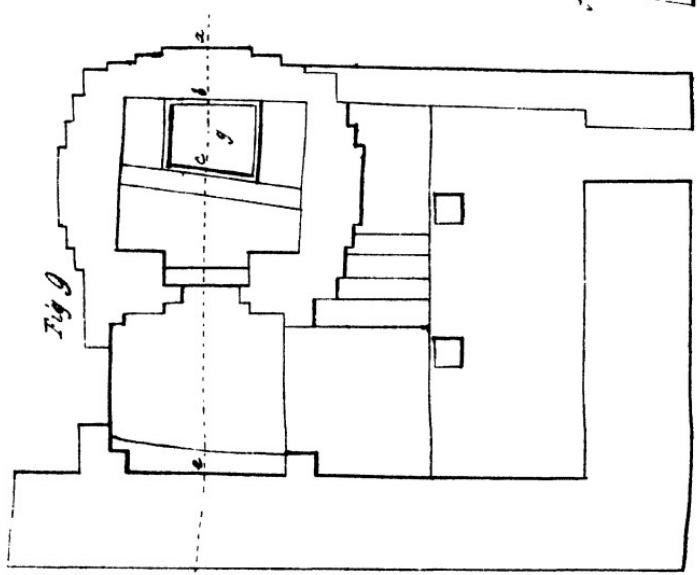


Fig. 9



Following the path at the foot of the fausse braie in the other direction, you reach, after a great deal of scrambling, three small shelving excavations, called Fakir's cave;(51) they are very shallow and so sloping that sitting in them even for a few minutes must have been a considerable penance.

The next object of interest after leaving the Pannáh gate is the Mrig Dhárá. There are here two contiguous chambers with domed and pyramidal roofs respectively ; they are built across the terrepleine of the rampart, and are terraced over at top, forming in fact a kind of casemated barbette (vide plan and section Pl. X. figs. 9, 10). In the inner chamber, *B. D.* is a small cistern or basin (*g*) full of clear delicious water, which is constantly trickling down from a hole in the side of the chamber ; I imagine this water must percolate from the Kot Tírh, a large tank on the high ground above.(52)

(51) These are not caves but merely small natural hollows slightly enlarged by manual labour. They adjoin each other, being only separated by a thin screen of rock, which, between the two furthest is cut through. There is no trace of sculpture here, and nothing, but the following characters in the middle cavity नन्दिता चट.

(52) Kot Tírh, from Sanscrit कोट a Fort, and तीर्थ a place of pilgrimage (especially water.) This is a large tank nearly 100 yards long, artificially formed in the rocky surface of the hill ; there are several flight of steps leading down to the water in different places. They have apparently been at one time profusely decorated with sculptures, some of which now remain. In the wall of the tank at the N. E. corner is a reclining figure of Vishnu Náráyana. On the pathway S. E. angle of the tank is a Ling with 4 faces about 2 feet 8 inches high (vide Pl. XI. fig. 11.) There are several buildings scattered round this tank, mostly modern, and a small dewálá at the S. W. corner, where there are some tawdry images and several curious forms of the Ling and Joni (vide Pl. XIII.) this end of the tank is formed by a wall, or rather blocked up bridge, which cuts off a small irregularly excavated portion generally dry ; probably this was only done to give symmetry to the tank ; the Kot Tírh is also said to be supplied by springs, and the bráhmans aver that in the S. E. corner is a large deep Báoli, whose mouth is hidden

the water. As I had no means of getting at the spot in order to plumb the bottom, I cannot answer for the truth of this statement. Besides this fine tank and the Burhiyá taláo already mentioned, there are several others on top of the hill. The Madár taláo, the Ramna near the lines, and the Sanichari, probably named from Sanichar or Shani, the planet Saturn ; these three are excavated in the rock, but are neither so large nor so carefully formed as the two before mentioned. Besides these there are two ponds nearly dry except in the rains, one to the N. E. of the bráhma's hut, is called Taleya or Tilegani, and the other on the parade, is called the Bijli Taláo, almost at the foot of the hill there is another tank called the Sursu Gangá, which seems to collect the water which finds its way from above. This is a considerable sized artificial tank with steps all round

On the right of the cistern is a small basso-releivo of seven deer, from which the name is derived, चरा, a deer, and धारा a stream or current. The origin of this name was explained to me by the bráhmans, as follows : "In the Sat Yug there were seven sages, (सप्त ऋषि) who offended their guru or religious instructor, and were cursed by him. In consequence of his curse they were transformed into hogs, and doomed to wander in Ujeinban or the jungles of Ujein, during the term of their lives, after which they became deer, and are so to remain during the four Yugs, and to subsist only on the food which pious worshippers set apart for them, when performing the ceremony of "pinda parna." The bráhmans repeat several couplets referring to this curious legend, which is a proof of the planetary worship shadowed forth in the Hindu Mythology. The "sapt rikh or rishi," are the 7 stars in "Charles' wain" according to Shakespear. Mr. Coleman's account differs ; he says, "The rishis were the offspring of the Bráhmadicas, who were the sons of Brahma. They are seven in number, and are named Kasyapa, Atri, Vasishta, Viswamitra, Gautama, Jamadagni, and Bharadwája. They are astronomically the husbands of the 6 Pleiades. How six and seven can accord, may be difficult to understand : mythologically they were seven sages, who obtained beatitude by their virtue and piety." The dates at Mrigdhára are chiefly of 1600.

About 100 yards beyond this a postern leads through a bastion on to a terrace or fausse braie, which extends some distance in either direction. There are two dried up kunds here, reached by steps, but no sculpture or inscriptions. They are called Kunbhoo (quære, from Kumbh ?). From hence to the Nil Káuth gateway, there is nothing to be seen except two or three guns(53) of the same description as that already mentioned ; one of them at z has the following inscription :—
 मनपसरत्रीमहराजधीरज श्रीमहराज श्रीरजहिरदेसहिजुदेव कारीगरनंदेसन।

it, originally profusely decorated with sculpture, much of which still remains, and fragments are visible in the water, at two of the corners are huge figures of Náráyana similar to the one in my sketch of last year, but having the 10 avatár, the Kurma avatár and various praying figures represented above and below. These figures are on slabs 10 feet 6 inches long. There are a number of Lings here.

(53) At —————* there is an empty building called Singhásila ; it is a mere pile of stones, and I fancy from its commanding position it must have served as a look out.

* Blank in MS. Eds.

"Manpasar Srí Maháráj dhíráj Srí Maháráj Srí ráj Hiradesa Híjudev, Karigar Nandesan." Close to the gateway leading to Níl Kanth is a smaller gun with the following inscription : धुरधानो श्रीमहाराजबीरज
श्रीमहाराजबीरजहरदे rest obliterated(54) ; Dhuradhaní, Srí Maháráj dhíráj Srí ráj Hirade. Beyond the Níl Kanth gateway, (55) the interior slope of the rampart is studded with fragments of sculpture and architectural mouldings, all the way to E, where there was formerly a chandel building called "Parmál ke baith ke," to which most of these debris probably pertained; hardly any traces of the building now remain, as its destruction was completed some years ago to furnish materials for a tomb to Mr. Wauchope, who died at Kálinjar ;(56) at this point the rampart becomes suddenly sunk and runs at that lower level as far as F whence it is again raised as far as the main gate (j). Between E and F is the Madár taláo, which is a dark dismal looking artificial tank, something like Bhairon Kund, (i) but smaller; on the bank there is a small empty domed building, with a low vault beneath, also empty; there are no sculptures or inscriptions here and the place has a deserted appearance. Near F are the traces of another building, also attributed to Parmál, but no guess can be made at its nature, as it merely consists now of a confused heap of stones more or less chiselled and ornamented.(57)

The remaining curiosities in the fort are two images of the Baráth avatár, in which Vishnu is represented in the hog shape. One of them is on the path leading from the main-gate to Níl Kanth, and close to the latter place, it is formed of a fine grained bluish stone and highly finished. On the back of the animal is the Panch-mukhi, or Panchánan Ling;(58) the legs are broken off. The extreme length of the

(54) There are traces of other letters below this, but it is impossible to make them out. It was with great difficulty that I could decipher the inscriptions, as the letters are very badly shaped and merely scratched on the gun metal and filled with brass or some other substance.

(55) See in the sequel a supplementary account of Nílkánth in which I have included much new matter, and endeavoured to correct any deficiencies in my last year's Report.

(56) So say the bráhmans.

(57) Between this point and the main gate there is nothing to be seen; there are a few fragments built into the wall here and there, but they are of no interest.

(58) So say the bráhmans, though the Ling is the emblem of, and Panchmukhi and Panchánan, names of Siva. There are several pieces of sculpture scattered along the pathway, representing Devi Mahadeo, alone and with Párbati, &c.

sculpture is 5 feet and the thickness across the shoulder 1 foot 8 inches : it is shown in Plate XII. The other hog is under some trees a short distance S. E. of the Kot Tírth ; it is 7 feet 7 inches long and 2 feet 7 inches across the shoulder.(59)

Kálinjar having been originally sacred to Kálí, and being now devoted to Siva, of course the effigies of both are very numerous, especially the Ling and Joni form of Mahádeo and Párbatí (vide note 22). In figs. 19, 20, 21, Pl. XIII. several curious forms are shown ;(60) among them some which show a great affinity to the architectural column, which I am inclined to think is deduced from the Ling both being emblems of man. Among the classics the column base and capital complete, was always considered to represent the human figure.

Description of the Caves and Temple of Nilkanth, and the descent to them.

I have already stated that you pass through two gateways in the descent to the fausse braie, which contains the temple of Nílkanth. The upper gateway (in the main rampart, or enceinte) is said to have been built by Parmál Brimh, the last of the Chandel Rajáhs,(61) who flourished in the early part of the 13th century of the Samvat. This is probably true, for the style of the structure corresponds with that of the buildings, called generally Chandel.(62) On either side of the gateway there are inscriptions in praise of various deities, and containing pilgrims' names. One bears the name of some baboo and date અસ્ત્ર ૧૫૪૦, others are of ૧૫૪૨ and ૧૫૭૯, and one is shown in

(59) It is cut out of a block of the soft stone which composes the hill and consequently is in very bad preservation. Vide Pl. XI. fig. 13.

(60) See note 86 for a curious type of the Joni.

(61) According to a list given to me by Captain Ellis, assistant to Col. Sleeman, and which he had copied from a work of a native poet, Parmál Brimh, was the last of a line of 22 rajás, called the Chandel Rájás of Mahaba, who were fabled to be descended from Chandramá, (the moon) and Hemoti, a bráhmaṇ woman, hence the title Brimh.

(62) The pillars and decorations in the Temple or Rás mandal below, are precisely of the description, and the probability is that they also were erected by Parmál, or at all events by his predecessor Kirat Brimh, (Krim Khot, the founder of the fort) note 40. The bráhmaṇs stout this idea with horror and declare that the temple and cave were the work of Viswakarmá, the celestial architect, in the Sat Jug.

Linnæus, Methodus Det.

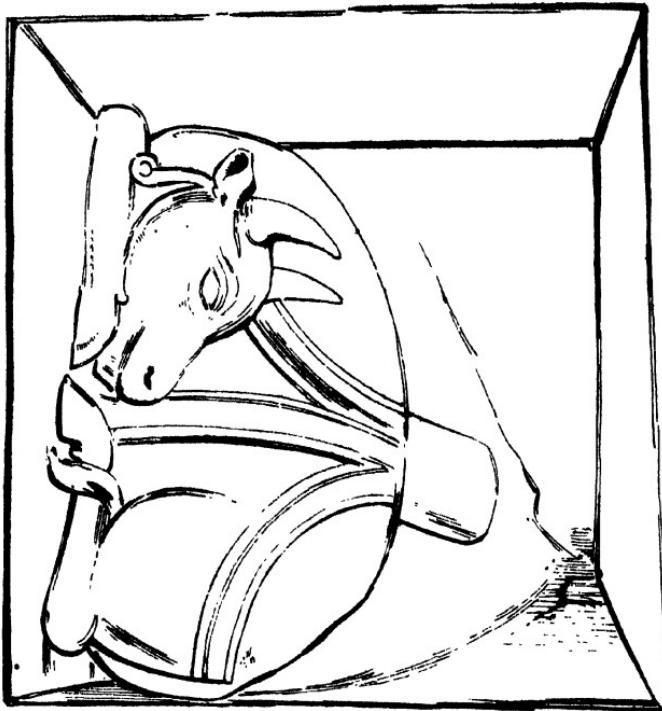


Fig. 14.



Fig. 13.

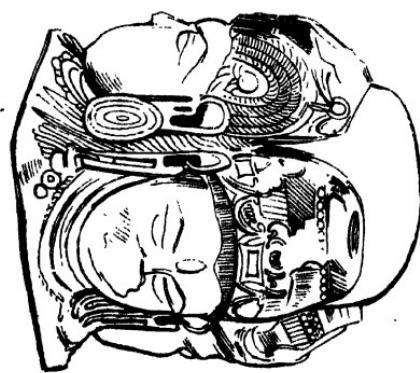


Fig. 11.

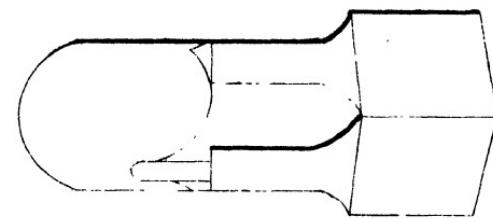


Fig 19

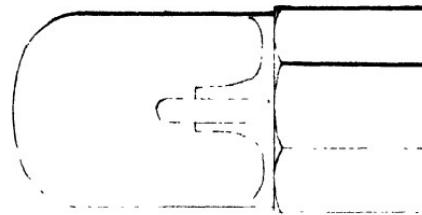


Fig 20

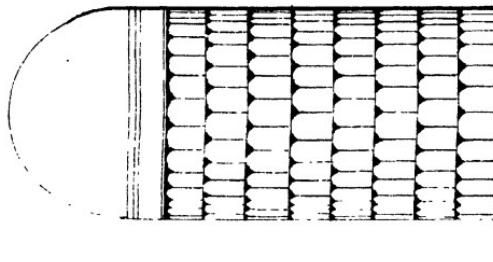


Fig 21

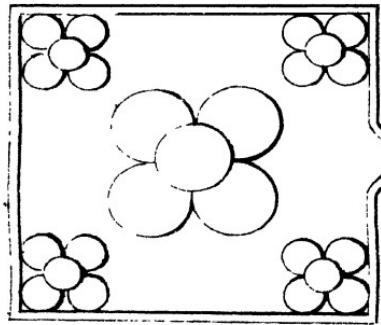


Fig 22



Fig 23

Li. *airay dat.*

Fig 19, *Wukü Ling* (1000 formed).
20, 21, *Different Ling*.
22, *Groups of Panch-mukhi linga in a square Toni*.

margin.(63) The lower gateway has no inscriptions ; it is said to have been built by Amán Singh, rájá of Pannáh.

Immediately below this gateway there are on the right two sculptures built, the one into the parapet of the steps and the other into the wall of the gateway. The former is the upper portion of a highly finished male figure, called Tulsídás (64) ; the arms are missing. The latter sculpture represents Rávan, the king of Lanká (Ceylon), attended by a number of male and female figures and demons, in rows on each side of him ; according to the bráhmans, these figures represent his wives, relations, familiars, generals, &c. Over these is a row of what appear to be Linga, some bearing a head, others the usual division in the Ling, and one a figure combating an animal.(65)

The length of this sculpture is 4 feet 1 inch, from which some idea may be formed of the minuteness of the work, owing to which, and to the perishable material (sandstone), the extremities are much obliterated.

The upper row contains nine four-armed skeleton figures holding clubs or sceptres. In the 2nd row on the left are five four-armed figures, holding clubs or sceptres, and a kind of ball(66) ; on the right three four-armed figures, two hands joined, as if praying, the other two rest on intervening pedestals ; also three large figures, one holding a child and a sceptre, and another a musical instrument(67). The third row contains male and female figures with four arms, two hands, holding lotus, sceptre, and the other two resting on pedestals, also a seated figure playing on an instrument. In the bottom row are male figures with the lotus, sceptre, and pedestals, as above.

Rávan appears to have had 3 heads ; the only one remaining is that of a lion ; on each side of him is a female figure, seemingly surmounted

(63) बोलकंठ प्रशासुदाक जुग जुग नियंप्रति संवत् १५४० सनये वैद्याकसुदि
११ गुरौकह लिखा।

(64) A famous fakeer or gosáin.

(65) Some say that these emblems represent the gods, deots, &c. who aided in the siege of Lanká,—so that this figure may be Hanumán ; others call them the "das mastakb," but as there are 12 of them, and have to all appearance originally been 14, I cannot understand that name.

(66) From the huge ear and fat bodies, these figures have the appearance of Ganesh, but they probably represent some monsters in Rávan's army.

(67) Vina or Lute.

by the hooded snakes(68). In the small building on the left are several badly executed figures, viz. Ráma holding a sceptre; Sitá with a closed lotus flower; Lakshman with club and bow, an armed male figure discharging an arrow.(69) Mahádeo as Nandigan with worshippers, (vide note 13); Hanumán with his foot on the demon, who attempted to impede his approach to Lanká(70); there is also a small seated figure, with one standing and presenting an offering to it: among the numerous sculptures which line the right of the descent, I have selected 2 for sketches on account of their curiosity; one is the sacred bull Nandi with Mahádeo in the Ling shape on its back, (vide Pl. XI. fig. 14), it is clumsily sculptured in a square niche, as seen in sketch; near it is Kuver, the Hindu Plutus; riding on the shoulder of his vahán, a man(71). The sculptures which are built into the wall at the foot of the descent, consist of figures of Ganesh, Mahádeo, Párbatí, Fakirs, and a male figure with a bull's head, called Singha Gerick. With a former report, I enclosed a drawing in outline of the most curious perfect sculptures among those over the small caves on the left of the descent; (72) the remaining sculptures are so mutilated as to be quite unadapted for a drawing; their arrangement is as follows: over the first or highest cave,(73) a figure of Gaurí Sankar(74), with male and female wor-

(68) This sculpture is very well executed: under the principal figure is an inscription of which only the following characters remain, the rest being broken off:—**बोद्धस्तः**
पाल सम.

(69) Called by the bráhmans Bir Badh (Hero slayer) (?)

(70) I before called this figure Ganesh by mistake, the misnomer however is excusable, for the monkey's tail curled over his shoulder looks at first exactly like an elephant's trunk.

(71) Vide Plate XIV.—Kuver is a brother of Rávan, and also called Paulastya. The extremities of the figure are wanting, but he is usually represented with closed lotus flowers. The sculpture is 3 feet 6 inches high; it is let into the wall and has evidently been brought from elsewhere.

(72) Two figures of Kál-Bhairon and a skeleton form of Káli.

(73) This cave contains the sculpture given in the pencil outline which accompanied my last report; I then called the principal figure Káli, which is correct, but it is Káli, as Durgá, the champion of the gods, and the decapitated animal is not a cow but the demon Mahishur in the shape of a buffaloe, who was slain by Durgá.

(74) Gauri Sankar. The meaning of this word is I believe Mahádeo and Párbatí incorporated, which is in fact the Ling and the Joni personated. This conjoint form of Párbatí and Mahádeo is also called arddhanári, from **अर्द्ध** half, and **नारी** a female, or arddha Maheswara, half Mahádev; Siva is said to have thus incorporated himself with



shippers on each side ; over the 2d cave are small niches, two containing Ling and Joni in relief, with worshippers, and the remainders empty, though probably all at one time contained sculptures. To the right of 3d and over 4th cave are several figures of Mahádeo, both in the human and Ling shape, with a number of male and female worshippers ; another skeleton form of Káli, the bull Nandi and two armed figures, one discharging an arrow (Bir Badh), and the other weilding a sword, called Mahádeo ke pute (son) ; near this figure is the inscription (No. 4), dated ११८८, containing apparently the name of Madan Brimh Deo(75). The soft rock on which it is cut being quite exposed to the weather, the letters are very faint, and the dingy copy which I made is far more legible than the original. Below this and close to a figure of Narsingha, is the inscription No. 5, dated १२५९. The colossal Varáha-sarup lying on the ground in the corner of the fausse braie is much mutilated—the face, all the fore-arms and one of the legs being broken off. It represents Vishnu in the 3rd or Hog Avatár, in which he descended to recover the earth, which had been submerged in the waters of the universe by a demon(76). The figure is in very high relief, on a slab (11 feet 7 in. high) and proportionately thick. He is represented in a combatant attitude(77). The left foot raised on a sort of lotus pedestal or arch, under which are seated two female figures, surmounted by the hooded snakes, their lower extremities are in the form of snakes, which are coiled in a knot beneath them ; their hands are in the attitude of prayer(78). The fore-arms of this figure are all broken off, but traces sufficient are left to show that he held the usual symbols of Vishnu, viz. a gadá (79), padam(80), chakr(81), and sankh(82). He Párbatí to prove that he was all-powerful and possessed of both the male and female energies of nature.

(75) Madan Brimh was one of the Cíandel rájás, who built many temples, &c. at Mahaba ; he is the immediate predecessor of Kirat Brimh. In the list which I have before mentioned at Mahaba there is a large artificial lake which goes by his name.

(76) The three first avatars are supposed to refer to the deluge.

(77) The attitude exactly corresponds with that of the Varáha-sarup in the bass-relief of the 10 avatars, and there is also a small detached sculpture of the same subject in which the attitude is the same and the weapons and symbols perfect.

(78) These figures are called Nág Kaneyá.

(79) Club. (80) Lotus.

(81) Wheel-shaped weapon (discus.)

(82) Holy shell : the chakr is supposed by some to represent eternity.

holds the chakr against his breast and the elbow of that arm supports Lakshmi; he has a rich garland of lotus flowers, and behind him is a kind of tree or stem which separates at top into three rich scrolls, forming a canopy over his head. There are two inscriptions on this sculpture, one at top and the other below, dated 1540(83); the former contains the name of Ganesha, and the latter Uddaichand; the words preceding which, "Sutr Ghar," are, I fancy a corruption of "Sutár," a carpenter, workman (Viskarmá). The space enclosed by the pillars, a. a. (MS.) Plate III. is called the Rás mandal(84). I have already described it and the pillars, so that the plates require no further explanation than what is given with them. I mentioned that the present building is only the basement story, and that there were originally seven stages (vide note 13). The small brackets or corbels, A. A. fig. 2, (MS.) Plate VI. and M. N. O. P. fig. 2, (MS.) Plate VII. are said to have once supported arches, the crown being let into the cornice; there are no traces of these arches(85), but it is evident that some support existed, as the holes in the bottom of the cornices on each face of the octagon are still visible. S. S. is a small passage running round the cave; it is lined all along with Linga (r r r r) of different sizes, and a raised stone gutter (fig. 183, (MS.) Plate III.) also runs through it to drain the cave, or rather to drain off the water which is poured over the image. It is roughly excavated, and a passage through it is a work of considerable bodily labour owing to its confined size, and the fact of the gutter running along its whole length at a less height than two feet; to explore it I was obliged to creep along on my hands and knees, alternately bumping my head against the gutter and scratching my knees against a Ling, several of which are right in the middle of the passage, and in these

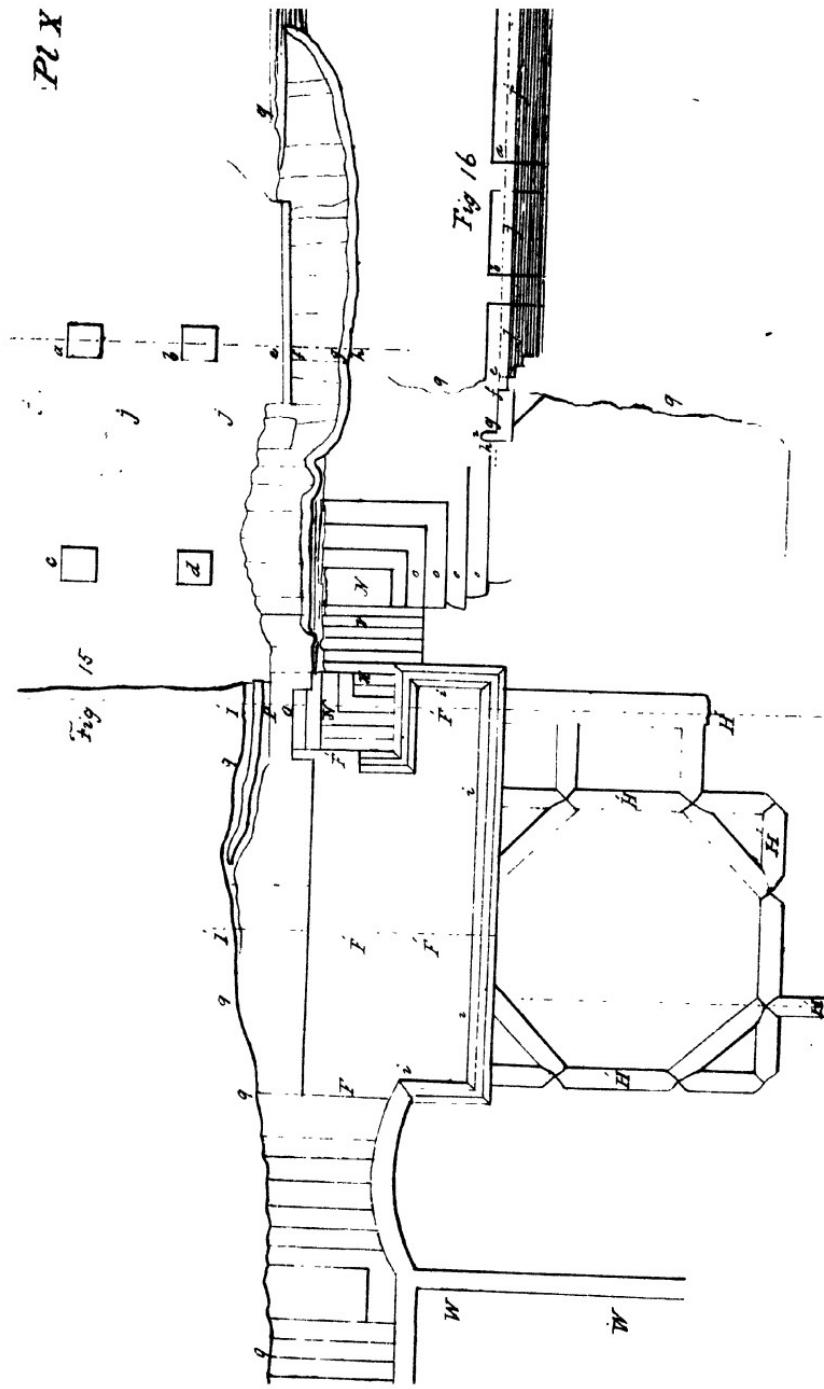
(83) अदिपहलप्रथमुगणेशा फंदि पद्रफलिहतं संवत् १५४० वंदिगणक प्रथम-
सबयरउद्दैचंद ४४० कार्तिक सुदि १५ निष्ठप्रति संवत्.

(84) Rás mandal, from रास, and चक्र, the former signifying a dance, and the latter a circle, circumference; this has probably some reference to the Zodiac.

(Ráschakra) Krishna's dance, called the Rásmandala, is described in Major Moor's Hindu Pantheon an astronomical meaning,—Krishna being represented as the sun, and the circle of dancers round him typifying the revolving celestial bodies.

(85) The arch was not, I believe, used by the Hindus until after the Musalmán invasion; the probability is that these corbel-supported ornamented cross pieces of stone, which were let into holes in the underside of the cornice.

Pl X



places it is necessary to sprawl at full length. The brâhmans say that this passage is a very important object to pilgrims, who attain great benefit from exploring it(86). The figure of Bhairon in the recess R. (MS.) Plates 3 and 4, already mentioned, is called the Bhatuck Bhairon ; it resembles the other figures of Bhairon, but is better preserved, owing to its being under shelter. The terrace over the facade of the cave, and in front of the Sarg Rohan(87), is shown in plan in Pl. XV., figure 15. The roof of the reservoir is supported by four neatly cut square pillars, left in the solid rock ; on one of them is a sculpture of Mahâdeo and Pârbatî, standing together in the usual attitudes, with a canopy of hooded snakes over them(88) ; I could not see these figures sufficiently distinct to make a drawing of them. There are several traces of inscriptions over the reservoir, but owing to the action of water, they are much obliterated. I made out dates of Samvat 1554 and 1579 ; the former bearing Manu's name. I could discover no inscription assigning a date to the Râs mandal. The stone flooring is covered with the names and dates of arrival of pilgrims ; among them many dates of Samvat 1400 and thereabout ; some of 1200, and one 1194, bearing the name Thâkûr(89).

The long Sanskrit inscription No. 1, is a facsimile of that on a large black stone slab, leaning against a pillar opposite the entrance of the cave(90) ; to the left is a portion of another inscription given in fac-

(86) I imagine the confined excavation must be emblematical of the Joni or productive power of Pârbatî or Bhavâni, also represented by the Arghâ or pedestal of the Ling, and that the entering into and exit from it are emblematical of spiritual regeneration ; Coleman in his Hind. Mythology, p. 175, says—Perforated rocks are considered as emblems of the Joni through which pilgrims and other persons pass for the purpose of being regenerated ; the utmost faith is placed in this sin-expelling transit.

(87) The name given by the brâhmans to the reservoir before mentioned.

(88) The figures appear to be finely sculptured, and are about 2 feet high ; the brâhmans say that under the water is a large Ling image of Mahâdeo, which confirms my supposition that the cave was originally free from water ; according to them the water is very deep at a little distance in, but I fancy the excavation is about the same depth as the other caves, for such a mass of water as their account would infer would long ago have carried away the slight screen of rock which is left to confine it.

(89) There is an inscription of the pillar, just above the cave given below :

बोहकंठ कच प्रसु निष्मवेशाच बदीवरपनीतारोक

(90) A copy of this is given in Col. Pogson's History of the Bundelâs ; a great part of it is entirely illegible from rough usage, the stone having been used at one time to macerate tobacco on.

simile No. 2 ; this is on soft sandstone, and consequently was more difficult to transfer than the former.

The facade of the cave must originally have had a very rich appearance, but it is now so plastered with whitewash as to be quite spoilt ; the lower portion is occupied by a row of standing figures of deotás, surmounted by scroll work ; above these the facade is divided into moulded compartments, and has four pilasters, apparently corresponding in style with the pillars in the Rás mandal(91) ; the space over the door is divided into four compartments, each having a circular foliated ornament, all this part is studded with holes, which the bráhmans say are from the nails or pegs to fasten down the metal plates with which the door-way was formerly covered ; a basement or plinth runs along the whole length of the facade, and is ornamented with figures of musicians and dancing girls.

The cave contains a black Ling about 4 feet 5 inches high, with 2 silver eyes(92) ; the side of the cave is relieved by several pilasters, on which are figures of fakirs, women, &c. They support a cornice containing figure of musicians, worshippers, &c. The small cave contains no sculpture, it is merely a receptacle for chiragh, gharás, &c.

The bass-relief of the Kurma avatár Pl. XVI.(93) is between the two

(91) The upper part of the facade on the right and left is much mutilated, and the two extreme pilasters are without capitals. The whole is so thickly whitewashed as to be quite useless in a sketch.

(92) It is a hideous image. I have given a small section of it in figure 4, Plate 4 ; in front of it is a small trough for the water and 2 stone slabs, on which the offerings are placed, n. n. ; near this image is another coarse imitation of a face called Kirat Mukh, and a tawdry dressed up figure of Púrbati.

(93) In order to produce the amrita, water of immortality, during the operation various wonders rose from the sea, which was changed to milk : first the moon, then Srí or Lakshmi, Surádeví, the goddess of wine ; the horse Uchaisrava ; the jewel Kaustabh ; Páriját, the tree of plenty ; Surábhí, the beneficent cow, and the mighty elephant Airávat, the vâhan of Indra ; these emanations appear to have been shared among the gods. Vishnu getting Srí and the jewel Kaustabh, Mahádeo, the moon, which he placed in his head dress ; Indra, the elephant, the cow, the tree and the horse Uchaisrava. In Coleman's Mythology another version of the Kurma Avatár is given, namely, that "Lakshmi in consequence of the curse of Durvásas" (Siva) abandoned the three worlds and concealed herself in the sea of milk, so that the earth no longer enjoyed the blessing of prosperity and abundance. To recover her the gods churned the milky ocean, as related in the Kurma avatár, by this means Srí was reproduced as Rambhá, the sea-born goddess, the Venus Aphrodites of the Greeks.

pillars at v. (MS.) Pl. III.; part of it is broken off; it represents the churning of the ocean with the mountain Mandára; on the right is Indra with his Chhátábardár; the mountain is represented by a human figure. Some of the wonderful emanations caused by this churning are shown in the sculpture: Srí, the goddess of plenty—seated near the tortoise, the Jewel Kaustabh, the white horse Uchaisrava. The bráhmans say that originally all that are mentioned in the legend were represented in the sculpture. It is $4\frac{1}{2}$ feet long and $11\frac{1}{2}$ inches high.

Underneath this is another bass-relief of the 10 avatárs of Vishnu—in two rows. He is represented in all his incarnations; several of the figures are represented standing and sitting on lotus thrones, and above the heads of the upper row is a kind of arched foliage (94).

The side entrance C. D. is flanked by small pillars, y. y.; on the lower part of which are figures in high relief: one is a skeleton Bhairon and the other Ganesh, (Pl. XVII.) he is attended by his váhan the rat, and has six arms.

Another of these small pillars at E. has a figure of Brahma; the upper portions of these pillars are divided into compartments containing small figures, mostly in indecent attitudes; scattered about near these pillars are several fragments and mutilated figures, comprising a seated Brahma with his váhan the goose; a seated female figure with a goose or swan, probably Saraswatí with her váhan the Hansá, emblemna-

(94) The Avatárs of Vishnu seem to have had beneficent objects, in which they offer a strong contrast to the incarnation of the Greek and Roman deities, which were usually for vicious or selfish ends.

The Machh or fish was to restore the lost Veda which had been stolen from Brahmá by the demon Hayagrívá, or according to some, to warn king Satyavrata of the approaching deluge. The Kurma or Tortoise, to support the world during the churning of the ocean; the Varáh or hog, to recover the world which had been submerged by the demon Mahásir; Narsingha, to punish the tyranny and unbelief of Hirankasipa: Vamana the dwarf, to humble the pride and reduce the power of Mahábali; Parusrám, to avenge the wrongs of his earthly parents upon the Kshetriya race; Rámechandra, to recover Sítá and dethrone Rávan the king of Lanká.

As Krishna he introduced the elegant arts, overthrew demons and wicked monarchs: as Budha he reformed and humanized the Hindu religion; as Kalki, which avatár is still unaccomplished, he will appear at the end of the world mounted upon a white horse and annihilate time and space. The horse in the Kalki avatar is usually shown with his right foreleg raised and the belief is that the signal for universal destruction will be the stamp of that foot.

tical of the river Saraswatí or Sursutí. There is also a group of Mahádeo and Párbatí seated on a throne and attended by several male and female figures. Mahádeo has his foot on the bull Nandi and Párbatí her's on the lion, her vāhan; under the throne is a small figure, apparently lifting it up, which the bráhmans say, is Rávan, who attempted to carry off Kailás the heaven of Mahádeo(95). The large Kál Bhairon I have already sent a sketch and description of; he has the moon in his head-dress of snakes and on his forehead a gem, which is often substituted for his 3d eye(96); he has the usual weapons and symbols in his various hands. In front of this immense figure a flight of steps leads to a posteru under the rampart, opening into a lower enclosure; in this enclosure is the Sidh ke gupha, shown in plan and section figs. 5 and 6, (MS.) Plate II.; it is empty, with the exception of a small seat, fig. 7, (MS.) Plate II.; the door way is reached by steps; there are several short inscriptions here in praise of Nílkánth and other deities; the dates are Samvat 1593, 1544 and 1500.

I think I have now described to the best of my knowledge all the objects of interest that are to be met with at Kálínjar, and my only fear is that I shall be thought to have entered too much into detail: however, I have expressed my meaning in as few words as possible, and any prolixity will I trust be excused in a paper treating of legends and stories so interminable, and sculpture and architecture so minute as those of the Hindus.

Having made a hasty visit to Ajighar near Kálínjar, I append a short note of what is to be seen there, thinking that it may prove interesting.

(95) The distorted figures which are seen in many Hindu sculptures, supporting larger figures or weights, represent Gutachue, the son of the forest king Heramba, and he is thus represented by architects to commemorate his infamy in having attempted the virtue of Draupadí, the wife of the Pándus during their exile; Bhima, one of them hearing of it, instructed Draupadí to make an assignation in the temple, and during their interview he tore down the columns of the temple, meaning to destroy the object of his rage. Gutachue to save himself and Draupadí, exerted gigantic strength and supported the whole fabric until released, in which painful and distorted attitude, he is usually shown by sculptures.

(96) Siva has three eyes, whence his name of त्रिलोचन, tri lochan, answering to the Jupiter Triopthalmos of the Greeks, both are the personifications of Solar fire and the spirit of all created things. The seeming contradiction implied in the worship of Siva as the destroying genius and the creative principle also, is probably allusive to the laws of nature, in which destruction is merely decomposition, or reproduction in another form.

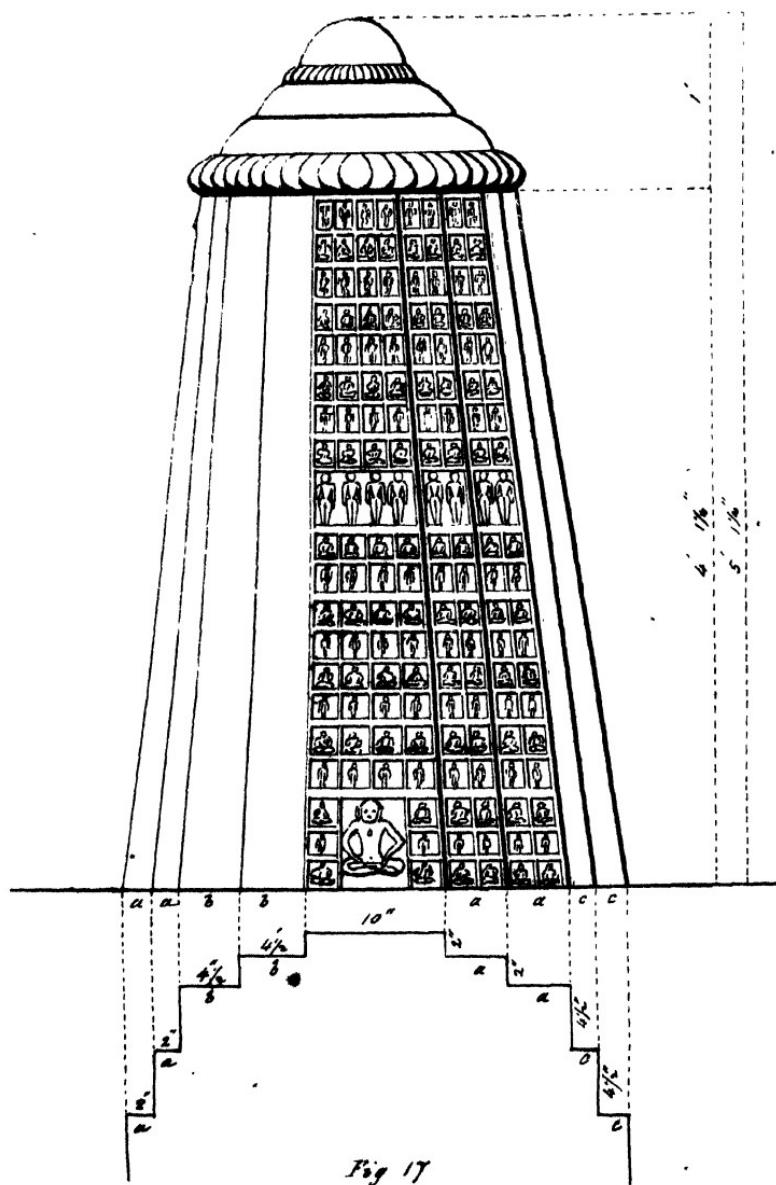


Fig. 17

The fort of Ajighar,(97) about 16 miles from Kálinjar, is similar to it in its nature and situation, but much smaller ; the ascent is only partially fortified, and is steep and difficult. In this ascent there were, as in Kálinjar, seven gateways, three of which are still in existence.

To the left of the second gate is a Tirth called the Gangá Jamná, consisting of two contiguous kunds, merely divided by a thin partition of rock. They are both excavated and appear to be supplied with water in the same way as the kunds at Kálinjar ; on the rock over the kund is a long Sanscrit inscription a good deal obliterated(98) ; there are a few pieces of sculpture to be seen in different parts of the ascent, among which are figures of Ganesh, Hanumán, Nandi, &c. A little inside the top or main gate is a ruined tank, called the Digi Talao ; it is cut partially in the rock and has steps leading to the water a short distance across the Parade, in an easterly direction, you see a stone enclosure containing a coarse image of Hanumán, about 6 feet high ; near this enclosure are some small fragments of figures. On the oposite side of the pathway, are the walls of a square building, which has apparently once had a conical roof(99). On one side of the interior of the building are 3 large naked figures of Parasnáth or Nemnáth(100), and 2 small similar ones. The centre figure is about 12 feet high—the 2 side ones about 6 feet ; the two latter are partially imbedded in the floor, the head and shoulder of the former protrude above the wall. The figures are naked and have 2 arms, holding in each hand a flower,

(97) It is said to have been built by a rájá, Ají Gopál, whence the name.

(98) I could not discover a date and was unable to make a copy of the inscription, as I had no materials at hand, having merely ridden over to see the place, intending to return and do any thing that appeared of interest. I was unable to put my intention into practice, as at the time of my completing the Kálinjar work it rained so much for a few days as to preclude any possibility of my going, &c. I had not time to wait longer.

(99) The ornamental stone which crowned the apex of the roof is lying near ; it is covered with small figures alternately setting and standing in rows ; they all appear to be figures of Parasnáth.—A sketch of this stone is given Pl. XVII. ; it is 4 feet 8 inches high.

(100) Parusnáth, the lord of men, or as in Coleman's Parswanátha, is according to him the principal deity of the Jaina sect, and by some supposed to be their founder. He is thought to be identical with Vishnu, and is known under 10 forms or avatárs. The account given of him by the Ajighar bráhman is that he is a devil and not a god, and worshipped exclusively by the Sarowgi or Sarawak class, and Bunniyahs, who according to the tale of the bráhmans used formerly to immolate bráhman children to it.

probably a lotus ; on the breast is a gem or perhaps a flower, called the Duk Dukke (101) ; the hair of the head is short and curly (vide Pl. XIII. fig. 23) outside are several other pieces of sculpture, including figures of Devi, some seated figures of Parasnáth, &c. ; a little beyond this is a large tank, excavated in the rock, with steps leading to the water ; under a pepul tree on the side you first reach, are several Ling and Joni, a Ganesh and a slab, 18 inches square, covered with small Panchánan Ling like a chess-board. There are also a large Panchánan, or Panch-mukhtí Ling figures of Mahádeo and Párbatí and Nandí, the latter at the right hand. Corner of tank, on the right bank, is a large ribbed stone, which formerly crowned the apex of the Pagoda, which will be shortly mentioned. On the east bank are two buildings of a plain and modern appearance, one is empty, and the other contains small insignificant figures of Náráyan and Lakshmí, Ajípál, Ganesh and Hanumán; close to the building is a Vará sarúp, (figure of Vishnu as the hog), it is about 5 feet long, and of coarse workmanship, and is standing on the dry bed of the tank (102)

The chief objects of interest at Ajighar are four ruined buildings ascribed to Parmál, and called Chandeli Mandir ; three of them are temples, two dedicated to Bhagwán or Vishnú, and the third to Mahádeo ; the 4th building is of a confined cross shape, called Parmál ke baith ke. These buildings are on the bank of a large tank called Parmál ke taláo. The three temples are in a very ruinous state, but enough remains to show their design, and the gorgeous appearance they must have had when perfect. The general plan of them is a circular or poly-angular enclosure, exactly like the Rás mandal at Kálínjar, and called by that name, but the pillars, though very rich, are less elegant, owing to their squat proportions ; in each of the temples is a small and elaborately carved doorway opening on a small recess or shrine, which originally contained the effigy of the deity (answering to the cave of Nilkánth) ; the conical roof or dome is over the shrine. The outside of the temples are most elaborately carved in a succession of rich mouldings and scrolled pannels, with figures here and there, the whole having

(101) Probably a gem, from which perhaps the name is derived, Paras or Parasnáth, lord of the gem.

(102) It resembles the image of the hog at Kálínjar, but is much defaced in consequence of the softness of the material.

a very light and elegant appearance: notwithstanding the profusion of ornament. The first of the three temples are pretty perfect, excepting the conical dome; it consists of a series of squat and highly decorated pillars in the shape of an octagon inside a square, with a small similar series inside, the whole roofed over with richly covered slabs, and having I think originally sustained an upper story. The door leading to the shrine is beautifully carved.

The second temple has only one series of pillars forming a circle in a square(103); the cornice is very rich. The Rás mandal is not roofed over, but the bráhmans say, that it was formerly surmounted by a domed roof. The shrine in this one is also very beautiful and the conical steeple more perfect. The Shíwálá is much mutilated, but it has evidently been similar to the others. These buildings are all formed without cement,—the stones being fitted closely into each other. The steeples or roofs are solid, and formed of rough unhewn stones inside, merely the outer layer being cut smoothly. There would have been ample material for drawings from these beautiful architectural specimens, but as I have before stated, I was unable to revisit the place.

EXPLANATION OF PLATES.

Plate VI.—Fig 1. General view of the plan of Kálinjar Fort, &c.

- J.* Koth Tírth.
- K.* Bijí Taláo.
- L.* Rammáh.
- M.* Sanícharí Taláo.
- N.* Taleyá.
- O.* Madár Taláo.
- P.* Entrance gateway to the descent to Nílkanth.
- Q.* Nílkanth.
- S.* Amán Sing's gateway.
- a.* Álm dúrwaza.
- b.* Ganesh ditto.
- c.* Chandrí ditto.
- d.* Gateway opening on the path leading to Balkhandí Mahádeo
- e.* Budh Budr darwaza.
- f.* Hanumán ditto.

(103) I have given a sketch of one of the pillars in Pl. XIX.

- g. Ditto Kund.
- h. Lál darwáza.
- i. Bhairon Kund.
- j. Main gate.
- k. Situation of Sítá-sej.
- l. Ditto of ditto Kund.
- m. Ditto of Patal Gangá.
- n. Situation of Pánch Kálí.
- o. Break.
- p. Barhúá Taláo.
- q. Pata Bhagán-sej.
- r. r. Fausc bræe round gate.
- v. Pannáh gate.
- w. Mrig Dhárá.
- x. Postern leading to Kund, called Khumbar.
- y. Singhásila.

Fig 2 Section on A. B. C. D. of fig. 1.

Plate IX. fig 7, Plan and fig. 8, Section of Mahádeo Kund.

Plate X. fig. 9, Plan, and fig. 10, Section of Mrig Dhárá.

Plate XV. fig. 15. Plan of the terrace over the façade of the cave, showing the reservoir called Sarg Rohán, the terrace in front of it, the steps leading to it and the shape of the entablature (H H H H H)

F' F' F' The terraces. (The black dotted lines I' F' F' H' and I' P' O' N' F' H' correspond with the lines A' B C D E, and R A' B' C' D' E', in (MS) Plates 3 and 4.)

M' N' &c. o o o steps. W W top of building, containing musical instruments, z z z z, Parapet of terrace, q q g g line of rock.

Fig 16. Section on a b c d e f g h of fig. 15.

a b c d, Pillars supporting roof of Sarg Rohán, (on the pillar D is the sculpture mentioned,) j j j Level of the water in the Sarg Rohan.

Plate XX :—

Fig 1. Elevation of the capital of a rectangular column, and the entablature over it, with their ornamental carving. The whole of the entablature is of this style, except the inner faces of the octagon, (Plate XXI.) and the fragment shown in fig. 4.

Fig 3. Elevation of a base (the same in each column.)

Fig 4. Elevation and profile of the fragment of cornice over the entrance (MS Pl. 4, fig. 2.)

Fig 5. Elevation and profile of the side of the stone floor or basement within the Octagon.



Plate XXI :—

Elevation of a grotesque capital and its ornamental carving and entablature at the angle of the Octagon. The elevation is taken from the interior of the Octagon, as the entablature on the inner side is carved differently from the other portion.

Plate XXII :—

Drawing of another grotesque capital.

Plate XXIII :—

Carved shafts of both orders of columns in front of the cave.

NOTE.—The Editors regret that owing to the sickness of the Pandit upon whose assistance they relied in transcribing the inscriptions which should form the Appendix to the foregoing paper, they are compelled to postpone the publication of these till next month.—EDS.

Journal of a trip through Kulu and Láhul, to the Chu Mureri Lake, in Ladík, during the months of August and September 1846.—By Capt. ALEXANDER CUNNINGHAM, of Engineers.

Leaving Simla on the 6th August, we proceeded via Kunihár and Sáhihetí to Biláspúr on the Sutlej, which we reached on the following day, and on

Saturday, 8th August 1846, we crossed the Sutlej in the ferry-boat, which was swept down the stream a considerable distance, the river being then at its greatest height. Some of my baggage was conveyed across on *dhrés*, or inflated buffalo skins. Baron Hugel erroneously calls them *ox-skins*; a mistake which has not been corrected by his translator Major Jerry, who as an old Indian officer should have known better than to transport Hindus upon ox-skins. But the Major has been guilty of a bold piece of pictorial invention in the manufacture of a sketch to illustrate “the method of crossing rivers in the Punjáb on inflated skins,” where the buffalo skins are represented with horns, ears, and tails, as if the animal were alive, floating with the back out of the water, and the paddler astride across the back. In reality the skin floats upon its back with the legs upwards, and the paddler lies across the skin with his feet on one side—hanging in the water, while he grasps one of the legs in his left hand, and uses a small paddle with

his right hand. The horns and ears are removed and all the orifices are carefully sewn up, with the exception of one leg, which is left open for inflating the skin, and when in use, is secured with a piece of string or a leather thong. When crossing upon a single skin the passenger generally sits across the back of the paddler, or kneels upon the skin to keep his feet dry, whilst he holds on by the legs of the skin. A preferable mode of crossing is by two skins with a *charpai*, or bedstead fastened upon them, on which the passenger sits safe from all mishap, unless the waves should be high, when there is the certainty of being well wet with spray, and the chance of the skins being separated. As it rained heavily and the road was dangerously slippery, we halted at Chatwali-ki-heti, distance only 5 miles.

Sunday, 9th August. Marched again through heavy rain to Kumár-ki-heti, distance 6 miles. Baron Hugel spells this name *Kumagaheti*, and states that *gaheti* means a serai or lodging. This is a gross mistake, which might be pardonable in the traveller, but which cannot be passed over in the translator. *Ga*, *ka* or *da*, is the sign of the genitive case throughout the Punjáb, and *heti* means a shop. Kumar-ki-heti, or Kumár-ga-heti is therefore the shop of Kumár. Some of these *hetis* are single shops on the road-side, and they take their appellations from any local peculiarities of situation as well as from the names of the Banyas or grain-sellers who build them: thus *Bur-ki-heti* is the "shop under the Banian-tree," *Ghati-ki-heti*, is the "shop on the ghat," &c. &c.

Monday, 10th August. To Ghori Matoli, 8 miles.

Tuesday, 11th August. To the Sikunder ki dhar, 6 miles.

Wednesday, 12th August. To Mundi, 16 miles, over the Pass. On the previous night we slept at the village of Barla, not far from the top of the Pass; this morning we found the height of the Pass to be 5,430 feet above the sea. As the Sikunder-ki-dhar had attracted the attention both of Moorcroft and of Vigne, we made inquiries on the spot from the people of the country who were with us, in order to ascertain what foundation there was for Vigne's identification of this spot as the locality of the altars of Alexander. His words are—"no place could possibly have been chosen which would have been better adapted for the altars. Being by the side of the highway it became impossible for

any one to pass without seeing them."* It will be sufficient to observe that the Sikunder-ki-dhar is on the high road which leads to the poor country of Ladák, and not any where near the high road which leads to the rich provinces on the Ganges, whither Alexander was directing his steps, when his soldiers refused to proceed farther : on which occasion he erected twelve altars of stone on the eastern bank of the Hyphasis or Byás. It is besides particularly recorded that there was a desert to the eastward of the Hyphasis on Alexander's proposed route. I presume that Mr. Vigne will scarcely be so bold as to identify this desert with the luxuriantly rich valley of the Suket river, which lies to the eastward of the Sikunder-ki-dhar. He appears to have been chiefly attracted by the name and by "some ruins surrounded by a trench cut in the solid rock." Moorcroft however, with his usual sound judgment, came to a different and more probable conclusion regarding these ruins ; of which he says :—"The whole was evidently the remains of a fortified camp, but I found nothing to indicate a Grecian origin."† I found that the Baori or walled spring of water just below the Pass was also called Sikander-ki-baori, which as well as the ruins was attributed by the people to a Sikander, but not to Sikander Zulkarnein, or Alexander the Great. If the name has reference to a king, which is perhaps doubtful, I should incline to refer it to Sikander Lodi, the great image-breaking king of Delhi, who delighted in destroying the temples and gods of the infidels. Had he heard of the temples of Mundi, he could only have marched there from Kangra, (which was the Mahomedan head-quarters) over the Sikunder-ki-dhar, and in that case there is nothing more likely than that he should have formed a camp on the hill to command the high road, whilst engaged against the infidels in the valley below.

Saturday, 15th August, 1846. Crossed the Byás by skins at 5 P. M. The river was running rapidly—the right bank very much cut up, and huge rocks still falling into the stream. We heard the plunges of many of them while we were at Mundi ; halted for the night at the village of Air. So great a rise in the Byás, has not, it is said, occurred for the last hundred years.

Sunday, 16th August. Started at half past 5 A. M. ; road for first mile almost obliterated by the Byás ; marks of the high flood were clearly

* Vigne's Kashmir, i. 104.

† Moorcroft's Travels, i. 69.

traceable along the steep banks where the river has washed away every particle of earth and every trace of vegetation, and left the rocky strata bare for about 25 feet in height. The rocks look exactly as if blasted with fire along the course of the river, which is the more remarkable now from the green freshness of the foliage about. At 4 miles the road turns to the east, and ascends very gradually to the top of the Pachind Pass.

The Pachind Pass is 4,900 feet above the sea, and the level ground on each side of the Pass partly under cultivation, is 5000 feet high. This Pass commands the high road into Kulu. From the round topped hills right and left of the Pass, distant less than a mile, can be seen the fort of Bhyrkot in Kulu, the Jinetri Devi temple and the peak of Sháli near Simla. As a military position I consider Pachind as the most eligible that I have yet seen for the location of native troops. The height, 5000 feet, is sufficient for coolness. There are good slate quarries immediately below the Pass to the west, and a considerable supply of water, only 150 feet below the pass on the eastward, partly preserved in a well constructed Baori, but chiefly running down the face of the hill. This is a never-failing spring, and I observed no difference in the supply of water before and after the rains. I crossed the Pass on the 16th of June, first, and again on the 16th of August.

The iron mines of Kumán lie only 4 miles to the eastward; there is plenty of good building stone at the top of the hill; and there is wood procurable below the Pass in the neighbourhood of the slate quarries.

The position is 6 miles N. E. of Mundi, and it commands the high road, and only horse road which leads from the Kangra and Mundi districts into Kulu, and if it should be found necessary to locate troops in or near Kulu I would strongly recommend Pachind for the cantonment. Two companies might be stationed in Bhyrkot, and the communication be kept up with Pachind by signals of guns, both day and night.

From Pachiud the road descends rapidly to the bed of the Ohl river, a large torrent unfordable at all seasons. At the foot of the descent there was formerly a spar bridge across the Ohl, but the horizontal spars were burnt during the insurrection against the Sikhs a few years ago. The piers and sloping spars are however still perfect, and as they have withstood the extraordinary flood of this year, they are likely to

stand as long as the materials will last. Beyond the bridge the present road continued up the right bank of the Ohl river for half a mile, to a spot where the stream is rather smooth—and there we crossed upon skins—the clumsy but useful Dhrés. The Ohl rises in the snowy range, about three days' journey distant, and close to the source of the Serbrie river, which joins the Byás below Súltanpúr, in Kulu. From the Ohl the road ascends to the alluvial flat and then descends to the Utr-sál nullah, which we forded with difficulty. By repairing the broken bridge across the Ohl this ford would be avoided. From the ford the road continues up the left bank of the Utr-sál rivulet to Kumán, where are the iron mines, about 200 yards to the right of the Bunyá's house. The ore lies in thin layers and streaks in a dark micaceous sandstone. The stone is so soft that it is pounded by hand with small round boulder stones. It is then washed in small wooden platters and the sand is poured off with the water, leaving the ore in the shape of a coarse black heavy sand at the bottom. One seer of this ore yields half a seer of iron. The metal is considered good, and is sold on the spot at $2\frac{1}{2}$ rupees per pukka maund, or 1 rupee per kucha maund, of 12 seers, which is cheaper than it was in Moorcroft's time, when the price was $3\frac{1}{2}$ rupees per pukka maund.

From Kumán the road descends to the Utr-sál nullah, which was again forded with less difficulty than before. We halted at Utr-sál in the Dharmásála, which was 4,255 feet above the sea.

Monday 17th August. To Bajaora, 9 miles. The road from Utr-sál to the foot of the Ghát was but little injured by the heavy rains of this year, but the ascent of the Bajaora Ghát, which is commonly called Kandi, was very much cut up. The ascent lies through a thick forest of large trees, and the ground is literally enamelled with flowers, among which the wild sweet-scented pea is very luxuriant. In June, when I crossed this Pass before, asters were the commonest flowers, but they had now disappeared. On the eastern face the road was completely obliterated, excepting in a few isolated spots. The heavy rains of this year have swept away all the alluvial soil from the bed of the Bajaora nullah, and left behind only a wreck of enormous boulders and fragments of trees. It appears to me that it would now be very difficult to make a road down the course of the nullah, on account of the steepness of the hills on both sides. As this was the high road

through Kulu to Ladák, I presume that the Government would wish to keep it in good order; and I would suggest that instead of attempting to repair or rather to re-make the road down the Bajaora nullah, it would perhaps be better to take a new line altogether from the Bajaora Pass towards Bhyrkot, keeping the road below the fort. This part I have not examined; but from the fort downwards to the Byás there is at present an excellent foot-path along the gently sloping side of the hill, passing through villages and corn-fields for above five miles to the bank of the Māwar nullah beyond Sumsi. By taking the road in this direction a saving of about 4 or 5 miles would be effected in the distance between Mundi and Súltanpúr.

The height of the Bajaora Pass is 6,484 feet.

Tuesday 18th August. To Súltanpúr, the capital of Kulu, 9 miles. At two miles crossed the Kokan Khud. Kokan is a large village on a spur of the hill, with a new picturesque Chinese looking temple—chiefly built of wood. Since I was here in June last, the Kokan torrent, owing to the late heavy rains, had destroyed a large tract of well cultivated land 200 yards at base, by 250 yards or more in depth. The whole of this tract, which two months ago I saw smiling with young green rice, is now covered with large blocks of mica slate, in some places about 20 feet thick. The only part of the Sikh road now traceable is near a large tree, which is still standing in the midst of the rubbish, with its square stone terrace around the trunk, for the accommodation of travellers to rest beneath its shade.

The delta of the Māwur nullah is now about 400 yards broad at the base, by five or six hundred yards in depth. Only two months ago it was a well cultivated tract, but it is now strown over with huge blocks of mica slate and thousands of trees, and fragments of trees of all sizes, looking like Nature's timber-yard.

Just before entering Súltanpúr, we crossed the Serberi nullah by two spars thrown across the stream, the bridge having been carried away by the floods. The bed of the Serberi is also strown with trees, but there are no marks which show so sudden and great a rise as must have taken place in the Bajaora and Māwur nullahs. The heavy rains must have been confined to the hills south of the Serberi. Probably the Parbati, Gomati, Synj, and Tirthan also rose very high this year, for the first has carried away all the bridges built by Lena Singh on the road to the

hot spring, called Parbati Künd, and the others have carried away all the bridges on the lower part of their course. Even small dribbling threads of water, as they appear now, were (about the 1st, when the floods happened) large enough to move blocks of stone about 10 feet cube from 100 to 150 yards along a very gentle slope, and to cover the fields 10 feet deep with clay and sand.

These floods fully account for the unprecedented rise of the Byás river, which the people of Mundi say has been higher this season, than for the last one hundred years. All the small streams which feed the Byás, have this year swept down large trees and enormous blocks of stone, along with clay, sand, boulders, and mud; and have deposited a mass of rubbish or the alluvial and cultivated flat on the banks of the Byás. A similar flood must have occurred at least once before within the last 250 years; for at the village of Hâth, opposite Bajaora, there are two stone temples which were built by Syâma Sen, Rájá of Mundi, just 250 years ago, one of which is on high level ground, but the other is more than half buried in rubbish, about 10 feet deep, which tradition says was brought down by the Bajaora nullah more than a hundred years ago, on account of the negligent government of a certain Bhosul Rájá. His extreme carelessness regarding the affairs of government has passed into a proverb, which is in the mouth of every one.

Bárah pétub, athárah dâni,
Bhosul Rájá, khabar na jáni.

Which may be translated—

One of twelve gourds took each exciser
And Bhosul Rájá none the wiser.

The town of Súltanpúr is surrounded with dry stone walls; only 200 of the houses are now inhabited, and the place appears to be nearly deserted. In 1839 about 400 houses were inhabited, but even in Moorcroft's time, A. D. 1820, the town bore marks of decay. He says, "Kulu is of no great population or extent." There were formerly between 600 and 700 inhabited houses. The town is also sometimes called Raghunâthpúr, from a temple dedicated to Raghunâth.

Wednesday 19th August. Marched to Dwâra, 10 miles. Road along the right bank of the Byás, paved with large stones from 10 to 50 feet above the river for the first 3 miles. It then descended to the

bank of the river, and continues along the water's edge for some distance. The stream divides, and winds amid luxuriantly wooded islets, now rushing impetuously in one sheet of white foam over rocks, and again murmuring occasionally unseen between overhanging* trees; now joined by torrents vehemently roaring and white with foam; and again gleaming placidly in the sunshine between the numerous islets, which are covered with many kinds of trees, including the apricot, the peach, the apple, and the pear—with the wild vine and wild fig. The scenery is remarkably beautiful, and extremely pleasing to the eye from its greenness and variety.

Just before reaching Dwára, we crossed the Phajloti or Phajrâni nullah by a bridge of spars 100 feet in length, with a planked roadway 4 feet in width. The span of the bridge was 60 feet, with a rise above the stream of 18 feet. The Phajrâni is a large unfordable nullah, with a bed full of boulders.

At Dwára we procured fine large wild apples with plenty of good cucumbers and peaches. We put up in the same Dhärmsâla, which Capt. Broome and myself occupied in 1839. A Dhärmsâla is properly a traveller's house, and it is sometimes attached to a temple, as at Dwára. In 1839 it was unoccupied, but this year we found that a Gosâin had established himself in the building—to the exclusion of all travellers, who are obliged to put up in an open shed close to the Dhärmsâla. Height of Dwára 5,150 feet above the sea.

Thursday 20th August. Marched to Monâli, 14 miles. For the first two miles the road lay along the edge of an alluvial flat, it then descended to the low ground near the river which was covered with boulders and jungle, through which it continued for one mile, occasionally along the brink of the river. It then ascended a rocky point, and again descended to the river, in which, at the foot of the cliff a pathway about 50 feet in length was constructed of loose stones, which were covered with water. Beyond this point to the Sítâ kûnd, 9 miles from Dwára, the foliage was very thick. The large sweet pea, and small plants, with pink and blue bells were very common; and the jungle was filled with the gigantic nettle, 8 and 9 feet high, with leaves more than a foot broad, and from a foot to a foot and a half in length.

The Sítâ-kûnd is a hot spring of a bitter taste: temprature 104°; the same as I found it in 1839. It is 5,700 feet above the sea, in the middle

of the valley, and only a few feet higher than the level of the river. It is surrounded by a low wall of masonry, and is enclosed in a small tank 12 feet square, and 3 feet deep.

The road from the hot well to Monáli for five miles lay through a thick tree jungle. The occasional glimpses of the Byás shining amongst the trees with its numerous tributary torrents dashing and foaming over huge rocks as they descend into the river, are very beautiful. The height of Monáli is 7000 feet above the sea ; just before reaching Monáli, we crossed the rivulet of the same name, a large unfordable stream, by a spar bridge, 60 feet in length.

Opposite to Monáli is the village and hot spring of Vashishta Muni, a celebrated saint, to whom common tradition assigns the origin of the name of the Byás. The Sanskrit name is Vipásá. The origin of the name is thus related in the Mahábhárat : Vashishta Muni, being overwhelmed with grief on account of the death of his sons, who had been slain by Viswamitrá, became weary of life, and having tied his hands and feet with cords threw himself into the Byás river ; but the pious river burst his bonds, and wafted him ashore unhurt.

The following explanation of the above legend appears to me as simple as it is natural.

Just below Monáli and the hot springs and village of Vashishta Muni, the valley of the Byás closes in, and the gneiss rocks which have been thrust up through the mica slate are scarped on both sides of the valley, forming opposing cliffs, which rise to a height somewhat greater than the levels of Monáli and Vashishta Muni. The lower village of Monáli is situated on an extensive alluvial flat, below which, on the opposite bank of the Monáli nullah, there is a long spur covered with pines, which stands out prominently, and stretches nearly across the valley. This spur is much higher than the level of the Monáli lands, and I have no doubt that it once extended right across the valley, and pent up the river, which must then have formed a large lake, the bottom of which was the extensive alluvial flat of Monáli, which could only have been formed in this manner. Indeed, there is every appearance of the former existence of a lake in this part of the bed of the Byás, from which the waters made their escape between the gneiss cliffs just below Monáli and Vashishta Muni. When the lake existed the hot springs must have been covered by its waters. In the

course of time, as the gneiss rocks were either gradually worn down, or suddenly rent asunder, and swept away by the Byás river, the hot springs of Vashishta Muni were brought to light, or to use the language of the legends “the bonds of Vashishta Muni were burst” by the waters of the river, which was afterwards called *Vi-pâsa*, or “the bondless.”

The Mahâbhârat further relates that the sage Vashishta, being determined on suicide flung himself afterwards into the Satadree or Sutlej ; but the pious waters of the river divided themselves into a hundred shallow channels and left the disappointed sage on dry land : from which the river was ever afterwards called *Satadree*, “the hundred-channelled,” from *Sata*, a hundred, and *dree*, to flow.

Friday 21st August. Marched in the afternoon to Boorwa, distance five miles. We were detained at Monâli making arrangements about provisions, which we are obliged to carry with us, as Lâhul and the countries beyond produce little or no wheat. The road from Monâli to Boorwa was good ; the latter part much blocked up by numerous gneiss boulders, with which the whole of the Boorwa plain is thickly strown over. The cultivation about Boorwa was principally buckwheat.

Height of Boorwa above the sea, 7500 feet.

Saturday 22d August. Marched to the Lés-dhâr Dhurmsâla—8 miles. Just beyond Boorwa we crossed the Sarahi nullah, an unfordable torrent, by a spar bridge. From this point the road was a gentle ascent at first, then rather steep by steps built in the rock where the Byás is confined between precipitous cliffs. Just beyond Râlha, a halting place 5 miles from Boorwa, there is a picturesque fall of 20 feet, in the Byás, where the bed of the river is contracted to 8 feet in width. The same tree is lying across the stream, just overhanging the fall, which I observed in 1839, but it is now much decayed. Beyond Râlha, the ascent is by a flight of stone steps, generally very steep, to the Lés-dhâr Dhurmsâla. The ascent was extremely fatiguing, and rain having fallen during our journey, we found the wind piercingly cold even in the Dhurmsâla, which being built of dry stones without any cement admits the air through a thousand crevices. The height of Lés-dhâr above the sea is 10,500 feet. There are two buildings, about 20 by 10 feet, which were erected by Lena Singh Majithia since 1839, when I formerly travelled this road.

Sunday 23rd August. The ascent from Lés-dhar to the top of the Pass was gentle and easy. There was no snow on the Pass, and we were able to trace the Byás river to its actual source, 300 yards beyond the block of mica slate noticed by Moorcroft, to a ridge of mica slate at the top of the Pass, from beneath which it trickles forth in a gentle rill. Just below the block of mica slate a new temple has been built by Lena Sing Majithia, dedicated to the Rishi Vyása (or Byás Rikhi) the compiler of the Vedas. The Pass is 13,000 feet above the sea.

The descent from the top of the Pass to Koksar, the first village in Láhul, was steep but easy ; the distance about 5 miles.

Monday 24th August. The jhula, or suspension bridge over the Chandra river, not having been put up this year, we were obliged to halt on the left bank opposite to Koksar. This jhula is annually carried away by the snow, which is drifted down in enormous masses from the hills to the south. The river too is constantly varying in width. In 1820 when Moorcroft crossed the Chandra the jhula was only 96 feet long. In 1839, when I travelled this road before, it was 106 feet long : but this year it was 210 feet in length. One cause of the greater length of the jhula was the undermining of the projecting rocks on the southern bank, from which the bridge was formerly sprung. Large masses of this rock were lying immediately below the jhula.

This description of bridge is quite safe ; but it is very unpleasant to cross, from the little height of the suspension side ropes above the foot-rope, and the great play of the bridge, which swings about very much from side to side, as well as up and down, whenever more than one person goes upon it. I have seen a woman, a native of the country, sit down in the middle of the bridge, and scream for assistance ; many of the coolees also cannot cross with their loads, which they are obliged to make over to people of the place.

The Koksar jhula was formed of two side suspension ropes and a foot-rope connected with the side ones by smaller ropes at short intervals. Each of the side-ropes was formed of seven birchen-twigs cables of four plaits, and the foot-rope consisted of three cables of the same thickness.

Tuesday, 25th August. Crossed the Chandra river to Koksar. From this place there are two roads leading into Piti—the first down the Chandra river, the second up the river. The first, which is the better road, is that which we followed ; the second, which is much the shorter

one, is described as being very bad for the first half. By this route a laden coolee can travel from Koksar in Lâhul to Losar on the Piti river in six days. The marches are the following.

1. Old Koksar (deserted) on the left bank of the Chandra.
2. Halt (name unknown) ditto ditto.
3. Shigri, ditto ditto.
4. Hoolyâs, at the foot of the Koolzoom Pass.
5. Hoolyâs, on the opposite side of the Pass.
6. Losar.

Two other roads from Kulu, namely, one up the Parbutti river, and the other up the Raini rivulet, both join at Shigri. They are described as being seldom used, on account of the difficulty of the Passes.

Small firewood of furze bushes is procurable the whole way from Koksar to Losar.

Wednesday, 26th August. To Tehling 5 miles. Road stony, but generally good. The ascents and descents of the nullahs steep and bad. These might easily be made better with a very little labour.

Thursday, 27th August. To Sheeling, 7 miles. At Sisu we crossed the nullah of the same name by a bridge; the water foaming and roaring between precipitous rocks, with a fall of about 50 feet immediately below the bridge.

Friday, 28th August. To Goondla or Râni ki kothi, 4 miles. Road good throughout. Halted here on account of fever and ague, and to make arrangements about coolees and provisions. During our stay at Goondla the greatest difference between the wet bulb and dry bulb thermometers was $23\frac{1}{2}^{\circ}$ from 12 A. M. to 2 P. M., which shows an excessively dry climate. We also observed that a strong wind sprang up about mid-day from the eastward, which blew for two or three hours daily, raising the finely pulverized dust in clouds, which we found very annoying in this almost treeless country. At Râni ki kothi however there were numerous gooseberry bushes, and on the slopes of the hill above there were several clumps of the pencil cedar (*Juniperies excelsus*) which is called *Shûr* by the Lâhulis and Shupa or Shupka by the Lâdâkis and Bhotis.

Monday, 31st August. To Kârdang on the Bhâga river, 10 miles. Road to Gantâl at the junction of the Chandra and Bhâga rivers not so bad as in 1839, but still dangerous in parts from landslips. The

bed of the Chandra is here exceedingly narrow ; and the mountains are bare, bleak and wild, and blasted, as if freshly risen from the innermost and fiery depths of the earth. The limestone strata on the left bank are very much contorted. From Gantál to Kárdang, 4 miles, the road was at first very bad, with a steep descent, and a still steeper ascent over almost perpendicular landslips. The rest of the road was very fair. The country improves on approaching Kárdang ; and the view of the Bhágá valley, with the high picturesqe-looking houses in the village of Kárdang, situated on a commanding point, is really beautiful for this desolate district. There are numbers of trees too around the village, especially pollard, willows and pencil cedars, with numerous gooseberry and rose bushes.

Tuesday, 1st September. To Kolang. 13 miles. A large village with temple. Road, for 3 miles, along the left bank of the Bhágá river, bad : but it could be easily made into a very good one. Crossed the Bhágá by a *Sanga*, or spar bridge of 38 feet span, and 40 feet above the stream, having a roadway 4 feet broad of split spars without a hand-rail. At this point the river is confined in a narrow chasm of only 30 feet in width, between siliceous rocks, in which the waters forever rush and rave impetuously and frantically from side to side. From the bridge there is a steep ascent to Goomring : thence the road lay for 3 miles amidst cultivation along the edge of the bank and about 600 feet above the river. For three miles more the road ran through a thin forest of pencil cedars and along the edge of very steep rocky cliffs—then again over rough, stony, and barren ground for 5 or 6 miles to Kolang. Throughout this march the road was bad. The hills on the opposite bank of the Bhágá look barren and hideous, and scathed as if with fire—with bare and frightful precipices, so steep that even the snow cannot rest upon them. But high above all these rise the majestic snowy peaks of Rúnkánta and Tinú, the latter named from a village at the foot of the hill, khRún-kánta, the “avalanche-peak,” is a remarkable looking cone of snow which may be seen from Súltanpúr.

Wednesday, 2nd September. To Dárcha, 10 miles. A rapid, steep, zig-zaggy descent from Kolang, amidst granite boulders, to the bed of the Bhágá. Thence a tolerably level road along the river's edge, among stones, and over grassy ground for about 4 miles to Jaspa, a pretty looking village with plenty of trees about it. From Jaspa the

road for the first mile and a half was good, then alternately over loose stones and rocks to the bed of the Zanskár river, up which it ascends for nearly a mile to the Sanga or spar bridge,—which consists of 2 spars of 58 feet span raised 12 feet above the stream, with a roadway of split spars, and no hand-rail. The Zanskár river is a considerable stream, apparently as large as the Bhâga. Immediately opposite the Bhâga is joined by another large stream, the Milang. From the bridge the road follows the Zanskár river for about a mile to Darcha, a small, poor, desolate-looking place, completely bare of trees, excepting only five stunted pollard willows. From this place there is a tolerably good horse road up the Zanskár nullah into the district of Zanskár. Moorcroft's decaying and dangerous hill, to avoid which he was obliged to cross over to the Milang side of the river, is now quiescent, and the high road runs over the débris at the foot of it.

During our stay in the Láhul district the thermometer ranged between 40° and 50° at sunrise, and rose to between 70° and 80° at mid-day.

Thursday, 3rd September. To Shungnung or Chungnung, a mere halting place, 5 miles. Road for the first mile and a half a tedious ascent; then continuous rough and stony ascents and descents. No firewood at this place: the coolees used sheep's dung, with which the ground was covered in all directions.

Friday, 4th September. To Kitpobrang, another halting ground, 8½ miles. Road slight ascents and descents for 2½ miles to Dojám; a level spot used by the shepherds and traders as an encamping ground, then stony for 1½ mile to Patseo, where we crossed the Bhâga river. This bridge is dignified with the name of Patseo (or the stone bridge) merely because the roadway is formed of slates instead of the usual split spars. It is thrown across the stream at a very narrow point, where a large rock confines the waters within a space of 6 or 7 feet, the whole length of the bridge being only 12 feet. Thence for two miles the road is level and stony to the junction of a large stream which comes from the north. Beyond this the road turns sharply to the eastward up the left bank of the Bhâga for 3 miles to Kitpotrang; height 13,400 feet; country very stony, but covered with numerous strawberry plants. The hills still bare, steep, and scathed, as if with fire.

Saturday, 5th September. To the Yunam lake, 13 miles. Road for 5 miles good, but very stony; with a gentle ascent to Mongpa (or Mápú) a level halting place at the foot of the Bára Lácha Pass. From this point we crossed the Bhágā on a solid mass of snow, which stretched right across the river, and beneath which the stream rushed along impetuously. In A. D. 1820 Moorcroft saw a mass of snow across the river in this very spot. Beyond this the road was a gentle ascent for 4 miles to the Suraj Dul, or lake, which is a small oblong sheet of clear green water hemmed in at its western end by the debris of rocks fallen from above, about one quarter of a mile long, and half as broad. The water finds its way out of the lake unseen through this mass of disintegrated rocks. From thence the road was for nearly a mile almost level, along the dry bed of the lake, and then a short but steep ascent to the top of the Pass. From the total absence of snow this year the source of the Bhágā was traceable to a ridge to the eastward of the Pass, somewhat more than a mile above the lake. This is the true source of the Bhágā river; for the Chandra rises on the opposite side of the ridge.

We were particularly fortunate in the mildness of the season which had melted every trace of snow on the Pass. It is remarkable that we crossed the Bára-Lácha on the anniversary of the day on which Moorcroft had crossed it twenty-six years before us. He found the snow "lying in vast undisturbed masses," on all the great slopes and crests of the chain. Bára-Lácha, or as it is often called, Bára-Lách, means the "middle pass," it being the middle one of the three great passes on the high road from Ladák to Kulu and Mundi; the others being the Langa-Lách and the Kotáng.

At mid-day the temperature in the shade was 55° , and the boiling point of water by an excellent thermometer by Dollond, was 183.5° , which, following Prinsep's tables, would give a height of 16,276 feet, or 224 feet too low, the actual height having been correctly ascertained on two separate occasions by Moorcroft and Gerard, from barometrical measurements, to be 16,500 feet. In 1839 a capital thermometer belonging to Capt. Broome made the height to be 16,332 feet, or 168 feet too low.

The summit of the Pass is almost level for about half a mile. Each of the prominent parts is crowned by a pile of stones covered with

votive pieces of rag, and horns which are dedicated to Gépan. From the Pass the road descended along the side of the hill to the bed of the Yunam river, which rises to the south-east near the sources of the Chandra and the Bhâga. It then continued along the left bank of the Yunam for about 3 miles to the Yunam lake, a large sheet of water, 1000 yards long by 500 yards in breadth. It must have been formerly more than twice this size, and it is probably much larger even in the present day during July and August, when the snows are melted by the mid-day sun. When Moorcroft saw it, it was clear :—but we found it tinged with the pale ochrous clay which is washed into it by a small stream on the left bank of the river immediately above the lake. The dry bed is an extensive sheet of small stones, below which the water may be distinctly heard trickling towards the lake. On the 28th of September, when I returned by the same road, I found that the lake had shrank to about three-fourths of its former size, its level having fallen 3 or 4 feet, leaving the eastern side quite dry. The water was much clearer than before, which was most probably owing to the greater coldness of the season which had arrested the melting of the snow, and stopped the supply of water which formerly washed down the pale ochrous clay into the lake. Moorcroft remarks of the lake that “not a weed deformed nor a wave ruffled its pellucid and tranquil waters, there seemed to be no fish in it, nor was any bird nor even a fly in its vicinity.” The same solitude and utter desolation of the scenery around the lake was remarked by ourselves, and suggested the following lines, which are descriptive of the place :—

On Yunam’s still and yellow lake

No living thing is seen :

Along its bleak and rocky shore

There is no smiling green.

The scathed hills rise on all sides

As bare as at their birth,

When by tremendous force upthrust

Fresh from the depths of earth.

No joyous bird on early wing

Beholds the morning break ;

But winter’s stern and chilly eye

Frowns o’er the cheerless lake.

Eternal silence reigneth there
 Upon his snow-girt throne ;
 And the unsyllabled dull air
 Sleeps echoless and lone.

The dreary stillness that pervades
 Earth, air, and all around,
 Appals the heart ; and social man
 Longs for some cheering sound.

The traders with their laden sheep
 Who pass by Yunam's shore,
 Leave not their foot-prints on its stones,
 All desolate as before.

Yet to the simple shepherd's mind
 The place doth not seem lone,
 For every hill and mountain Pass
 Hath Spirits of its own.

But Gépan chiefly wins their love !
 To him square piles they rear,
 Upon each Pass ; with votive flags
 And horns of the wild deer.

Sunday, 6th September. Road at first along the edge of the lake : then over three sharp ridges of confusedly heaped up and angular blocks of ferruginous sandstone, down to the bed of the Yunam river. Moorcroft was informed, and appears to have believed, that this "scene of fantastic ruin," as he calls it, was the effect of an earthquake. Indeed no other cause with which we are at present acquainted could produce such mighty and extensive effects. Just below these ridges we saw the ruins of a former bridge, of which only two pieces of timber were now left, which, as fuel was scarce, we carried on with us to cook our food. Indeed, since leaving Darcha our only fuel has been the low, short, dry furze bushes, which with some coarse grasses, appear to be the only herbage of these dreary and uninhabited regions. Along the bed of the river we noticed, what had before attracted the attention of Moorcroft, the numerous and curious isolated hillocks composed of angular masses and fragments of rock. As far as our observation extended they always occurred in the midst of the alluvial flats : they could not therefore have been formed by accumulated stones which had rolled from

the mountains on both sides, for the mountains were too distant; besides which these hillocks were composed of angular fragments and not of boulders, which had been rounded in rolling from the action of water. They are most probably, as suggested by Moorcroft, "the harder fragments of a mass, from which the softer portions, the clay and sand, have been removed by gradual decomposition." Here we crossed the river, which was knee-deep and rapid, to Kelang, a shepherd's station, in a sheltered level spot. Large blue hares were numerous on these alluvial flats. They live under the stones in holes scooped out of the clayey sand. The herbage, though scanty, and dry, was eagerly eaten by the cattle. The neighbouring hills were of a reddish brown and pale ochrous colour, tinged here and there with slight patches of olive green and yellow grass. They were generally very low, the nearest not being more than 1000 feet above the river, and the more distant ones, which were more or less covered with snow, did not appear to rise higher than about 3000 feet above the river. We halted on a level spot without name, 14,600 feet above the sea, and 6½ miles from the Yunam lake. In this distance the fall has been only 680 feet, or little more than 100 feet per mile, which is a very gentle fall for a mountain stream.

Monday, 7th September. To mouth of Cherpa river—6½ miles. Road good, over a long level alluvial plain, in the midst of which was a square block of mica slate thickly imbedded with large crystals of quartz. This stone, which is 8 feet square and 12 feet high above the ground, is called *Lingti* by the people of Kulu, according to Moorcroft, and *Phālang-danda*, by the Ladākis. The only name that we could learn was *Phālang-danda*, which means the "boundary stone," the stone being a well known boundary mark between the states of Kulu and Ladāk.

Beyond this the road continued over the plain, which became gradually narrower to the bank of the Ser-chu, or Ser rivulet, a stream coming from the S. S. E., of which the source is 10 miles distant. A footpath was visible up its right bank, and the remains of a custom-house on a commanding point looking up the Ser valley, shows that this footpath was formerly used by the smugglers of shawl wool, and probably of borax. Just above the Ser, the Lingti, a large river from the S. W. joins the Yunam on its left bank. The road beyond the Ser laid over a dusty plain to the junction of the Cherpa or Cherep

river, which comes from the E. S. E. about 25 miles. It is a large stream, apparently of as great a volume as the united Yunam and Lingti rivers.

We halted at this junction after a march of only $6\frac{1}{2}$ miles ; height above the sea 14,210 feet, which shows a fall of 401 feet, or about 65 feet per mile in a straight course.

On the left bank of the Yunam, below the junction of the Lingti, the ferruginous strata of sandstone are contorted in the most confused manner. There are caves high up in the rock, but apparently of no great extent. In the beds of the Ser and the Cherpa rivers, the banks are formed of a coarse sandstone grit dipping towards the north at an angle of about 30° . The water of the Yunam river is a clear green, most probably from having been filtered through the Yunam lake ; that of the Cherpa is grey, a hue derived from the melting of dirty snow.

As there was a well trodden footpath up the left bank of the Cherpa, and as the Láhulis, who were with us, stoutly denied all knowledge of it, it seemed certain that this must be one of the principal routes used by the smugglers of shawl wool between Rodok and Láhul. As we could obtain no information regarding this route, we determined to dispatch a trustworthy party up the Cherpa, who should rejoin us at the Chumureri lake ; as we had little doubt that this route would lead upon the southern end of the lake. On their return the party reported that they had found a bridge 5 miles above the junction, and that the pathway was perfectly practicable even for laden animals, with the exception of an extensive landslip near the head of the Cherpa river. Several traders' or shepherds' encampments were noticed on this route, where both grass and fuel were procurable in the neighbourhood of the river. They described the Pass at the head of the Cherpa river as being so easy that with a little labour it might be readily made into a very good one. From thence after a short descent the route ran over stony alluvial flats along one of the feeders of the Para river, and over a low Pass to the southern end of Chumureri lake, as we had anticipated. The object of the smugglers would appear to have been to reach the Láhul boundary as near the Phálang-danda (or boundary stone) as possible, by some unfrequented route. A glance at the map will show at once that this route leads directly from the shawl countries of Rodok and Gardok via Hánli and

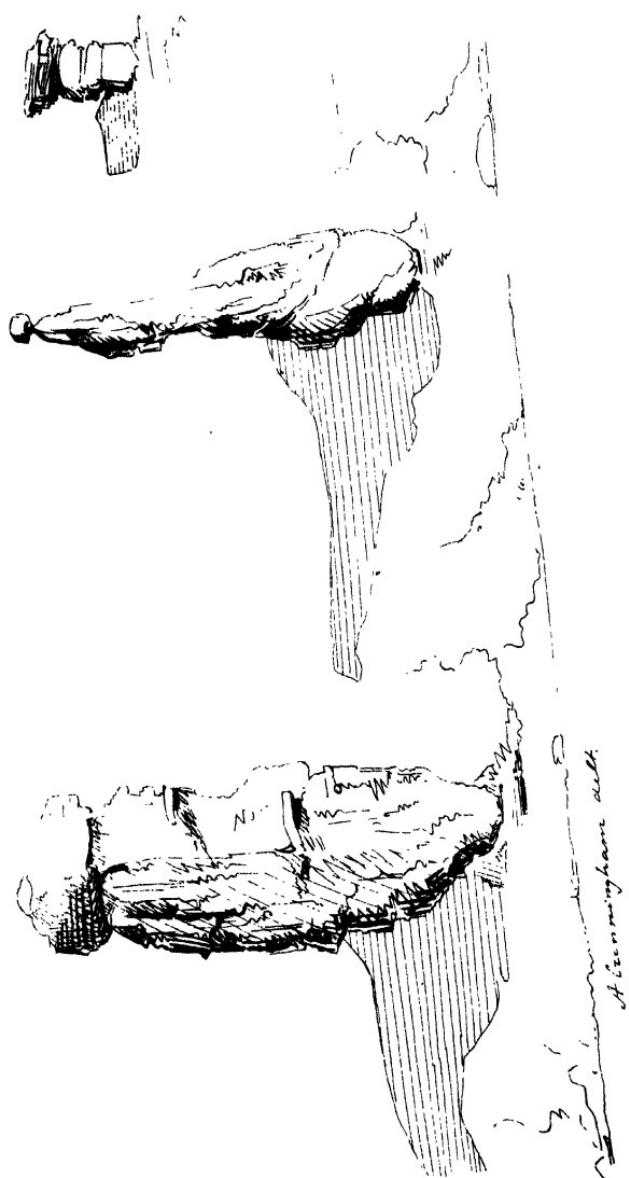
the Párá and Cherpa rivers to the Láhul boundary at the Phálang-danda: for the route by the Serchu is only an offshoot of that by the Cherpa. Were this route to be opened by the British Government, and a few Dhurmsálas, or travellers' houses, built at convenient distances, our traders in shawl wool from Noorpoor and Rampoor would be saved the heavy duties which are now levied by Maharaja Guláb Singh. One of these Dhurmsalas would cost about 200 Rupees: and eight or ten of them would be sufficient along the whole line of uninhabited country from Dárcha to Hánli. The most eligible positions, combining easy distances with the indispensable requisites of fuel, grass, and water, are shown in the map,* and the proposed Dhurmsalas are numbered from Dárcha eastwards and marked D. Our traders would thus be able to obtain their shawl wool direct from the Chinese districts of Rodok and Gardok, by a route through our own territory.

From the information which we received, and from the view of the country which Mr. Agnew obtained from the Lanka peak, the Cherpa is formed of two large branches, of which the general bearings were taken by Mr. Agnew. The northern branch leads up to one of the sources of the Para, and the southern branch leads directly upon the head of the Losar river, a fact which did not escape the researches of the accurate Moorcroft, who remarks, (I. p. 265,) "Beyond the Ladak boundary, it (the Losar) is said to meet with the Tsurip (Cherep or Cherpa) from the north."

Almost due east from the junction of the Cherpa and Yunam rivers, there is on the top of the hill, a remarkable square rock, which has so much resemblance to a Fort that it had received the name of Lanka from the shepherds and traders who frequent these parts. It is a well known point, and it can be seen from the Langa-Lách Pass, as well as from the neighbourhood of the Yunám lake. Mr. Agnew succeeded in scaling this height with some difficulty, at 4 P. M. he found the thermometer at 44° and the boiling point 181°, which after correction gives a height of 17,513 feet above the sea, or 3,300 feet above the alluvial flat at the junction of the Cherpa and Yunam rivers. The thermometer fell to 18° during the night.

Tuesday, 8th September. To Gadéra 6½ miles, crossed the Cherpa at 10½ A.M. the river rising fast from the melting of the snow. The

* This map will accompany another article by Capt. C. in our next number.—E.Ds.



stream was 100 feet broad, rapid, and strong and mid-thigh deep ; and the crossing was effected with some difficulty. In the latter months of July and August the Cherpa is not fordable except early in the morning, and the traders who reach its banks too late for fording are obliged either to halt until the next morning, or to go round by the bridge, which is 5 miles higher up the stream.

The road from the Cherpa was alternately over stony plains, and shingly slips from the rocks above. Just before approaching Godéra the plain is a succession of levels gradually becoming lower and narrower in size, and showing clearly the extent of a former lake at different periods, until the rocky obstacle, at a point about four miles below Gadéra, was burst through altogether and the lake completely drained. The height of Gadéra above the sea is 13,949 feet, which gives a fall from the junction of the Cherpa river of 261 feet in a distance of 6½ miles ; or just 40 feet per mile. At some former period it is clear that the bed of the Yunám river must have been a long narrow lake, the extent of which is shown in the map by a shade of brown confined between dotted lines.

The hills on each bank consist of hard siliceous rocks ; and the alluvial flats are formed of siliceous pebbles of all sizes strongly cemented together. Along the banks of the river we observed numerous rude pillars of this hard conglomerated gravel, which were generally crowned by stones of different sizes. In the bed of the Chánú nullah, near Godéra, and on the northern bank, there are two of these remarkable natural columns about 30 feet high, with their stone capitals ; one a very large block, and the other a much smaller stone, which appears to be balanced upon a point. These are the identical "insulated columns of pebbly conglomerate," described by Moorcroft in A. D. 1820, "on the summit of one of which," he says, "rested a block of stone many tons in weight, and upon the top of the other stood a smaller block nearly on a point." On my return I stopped at Godéra for breakfast, when I made the accompanying sketch of these remarkable pillars, (Pl. XXIV.) which prove both the extreme dryness of the climate and the minute fidelity of Moorcroft's descriptions. I fired a ball at the smaller stone, which is not more than 2 feet thick and apparently balanced on a point, but though the ball hit it right in the centre, the shock had no effect whatever. In a moist climate these pillars would not stand for a single

season; whereas we have, from Moorcroft's faithful description, the most satisfactory proof that they have existed exactly in their present state for the last six and twenty years. The larger one of these capital stones appeared to me from a rough calculation to be between 6 and 8 tons in weight.

Wednesday, 9th September. To Demra, 4 miles. Road for three quarters of a mile to the northward along the right bank of the Yunám river. We then ascended by a very steep zigzaggy path up the face of the hill to the eastward, until we reached the bank of the Chánū nullah. From this the path alternately ascended and descended over spurs of the hills on the right bank of the stream to Demra, a halting-place, where fuel and water are procurable.

Thursday, 10th September. To Gangá Anáj, 10 miles. Road from Demra, at first undulating, then a steep ascent for about 500 feet, after which a very rapid descent to the bed of the nullah at a level spot called Súmdo [the three streams, from *Sum*, three] where three small streams join their waters. From this point there was a long ascent for about 4 miles to the top of the Langa-Lách Pass, 16,043 feet above the sea. The Pass was crowned as usual by a pile of stones covered with bits of cloth, and dedicated to Gépan. From the Pass there was an easy descent for nearly six miles along the left bank of a nameless nullah, chiefly over steep, gravelly slips. Road stony and very narrow. The nullah is a mere ravine between siliceous rocks which rise from 1500 to 2000 feet above the bed of the stream.

At Gangá Anáj, where we halted, the bluish grey siliceous cliffs from 800 to 1000 feet in height, stand almost perpendicularly facing each other at a distance of only 120 yards apart at base, as shown in the sketch. The whole way down to this point the sides of the ravine are of a gravelly conglomerate lying in horizontal strata composed of fragments of all sizes, from several tons in weight to the smallest grains of the same bluish grey siliceous rock, cemented firmly together by some siliceous matter more or less mixed with clay. As the fall from the top of the Pass to this point is only 491 feet, and the cliffs are nearly 1000 feet in height, it seems almost certain that the ravine was once blocked up at this point, and that a long lake formerly existed there, in which this gravelly conglomerate was deposited in sediment, as it is composed of fragments of the rocks on each side.

Immediately above this point there is a high conglomerate cliff; and the ravine is even now closed to a height of 400 or 500 feet, by a confused mass of enormous blocks, both of the siliceous rock and of the conglomerate; but chiefly of the former; and the stream finds its way unseen beneath this mass of rubbish. This must have been the place where Moorcroft noticed an isolated rock more than 300 feet high, so much undermined that it threatened to fall "at no distant period." As there is now no rock answering this description, it must have fallen down not long ago. Immediately below this point however, there still exists the pathway, which runs as described by Moorcroft, for about ten yards between a detached pillar on the edge of the stream and the solid rock, and is only sufficiently wide for the passage of a man on horseback. It is on the right bank of the stream between a conglomerate mass and the cliff.

Friday, 11th September. To Pángtik, $5\frac{1}{2}$ miles. At two miles below Gangá Anáj clay slate first makes its appearance, contorted and twisted and broken in the most inextricable confusion and overlaid with gravelly conglomerate. Nothing short of the power of a mighty earthquake could have caused such extensive and complete disjointment. The strata appear as if they had been lifted to some considerable height and then suddenly let fall, which broke them up into small fragments, standing and lying at all angles. Beyond this point the road continues along the left bank of the nullah for half a mile to Ruptang, a shepherd's station, where it crosses to the right bank and follows the stream for a quarter of a mile farther to its junction with a second stream coming from the S. E. On crossing the latter stream, there is an open level spot of ground called Thoga Chokpo, which, from the numerous fire-places, is apparently a favorite halting-place with the traders. Just beyond this a third rivulet, also from the S. E. joins the others, and the united streams are called Súm-khel, or the three springs. Passing up the bed of the last stream for two miles we halted at an extensive level spot called Pángtik on its left bank; we were obliged to halt here as the nearest water on our road was still 10 miles distant.

On looking up the stream to the S. E. from Pángtik, the valley appeared to be so broad and open and the hills so low that we felt assured there must be an easy route open towards the Chumureri lake. A party was accordingly dispatched to ascertain this point. They

afterwards met us near the lake, and described the road up the Súmkhel as stony, but easily passable even for ponies. The pass appeared to them more like a gradual rise of the whole country than a ridge separating two valleys; after crossing which the road continued along the bank of a small stream which joins the lake at its southern end from the westward.

Saturday, 12th September. To Moré-cho (the Moré pond) a pool of fresh water, distance 10 miles and 1 furlong. Road at first a very steep ascent from the bed of the river for about half a mile, and thence level along the plain of Kyung, running nearly due north for six miles, and then N. E. for 4 miles to the Moré-cho, a pool of fresh water not more than 300 feet in circumference. On the 25th of September, when I re-passed this spot, the pool was quite dry. The plain of Kyung is from one to two miles in breadth, with a long bed of white sand to the S. W. of the Moré-cho:—the rest of the plain is but scantily covered with furze and grass.

This plain has evidently once been the bed of a long lake, the extent of which is shown in the map by a brown shade included between dotted lines. The point where the waters eventually burst through must have been just below Thoga Chokpo, at the junction of the three streams. The hills on the eastward are entirely of mica slate.

Sunday, 13th September. To Rúkchín, an encampment of Nomad Tartars, living in black hair tents; 7 miles, and 1 furlong. The road continued to the N. E. along the level plain of Kyung, which gradually diminished to half a mile in breadth. At 6 miles reached Rúkchú, an old station of the Nomads, where Moorcroft halted two days. One mile further turning up a ravine to the westward, we reached the Rukchin encampment, consisting of ten or twelve black hair tents, each containing 4 or 5 people.

These Nomads appear to be a happy race, who being satisfied with little, have but few wants. They are called Kampás (the Champs) of Trebeck. The men usually wear woollen great coats reaching below the knee. As they are never washed, but often darned and patched, these great coats are mostly rather tattered looking garments of many colors. They wear leggings also, generally of thick coloured woollen, which is put round the leg like a bandage and secured by a long garter, usually of black woollen rope, which is wound spirally round the leg

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from the ankle to the knee. Their short boots are made of goatskin or sheepskin, with the hair or wool turned inwards, and well stuffed with wool, which while it makes them warm to the wearer gives rather a clumsy appearance to his feet. The cap is generally a piece of goatskin with the hair inwards, or else a woollen one edged with skin or coarse red silk. The women go bare headed, but they wear lappets round the cheeks, and over the forehead, from which a broad band well studded with large flat badly-flawed turquoises and cornelians, passed over the head gradually narrowing until it reaches the waist behind. The hair is dressed in numerous thin plaits, which hang behind and over the shoulders, forming a complete fringe or rather a sort of well greased mane to the head and neck. They frequently wear long great coats and leggings like the men ; but I have seen them also dressed in three or four thick woollen petticoats, and a sheepskin jacket with the wool turned inwards over the coat. The men also wear these sheepskin jackets when they feel cold : and their tents are well supplied with them, as both sexes put them on when they go to rest.

The men are generally from 5 feet to $5\frac{1}{2}$ feet in height, and the women from $4\frac{1}{2}$ to 5 feet. Yet they are hardy and even strong. I have often seen the roof of my tent, which was wadded with cotton, carried throughout a whole march by one of these diminutive women ; although the taller and finer-looking men of Simla declared it to be too heavy for one of them to carry. These Nomads are generally of a deep brown complexion ; the girls are however rather fairer, and some of them have colour in their cheeks. They all have the small eyes of the Tartar races, and to use the words of an old traveller, they are "a square, stout, strong people having platter faces and flat noses." Their ears are particularly large, and many of them wear ear-rings. Both men and women carry about them all their property excepting some wooden pails for milk and the few large iron pans which they have for cooking their food.—Knives and spoons, pipes and tobacco pouches, flint and steel, and a small cup, either of iron, brass, or wood, are carried by every one. These are usually crammed inside the great coat above the waist, where also may be found a long piece of woollen rope for fastening packages, and occasionally a single or double flageolet, either of wood or brass.

Their cattle consist of herds of Yaks, or Grunting oxen, with the

long bushy tails, and droves of sheep and goats. The hair of the Yâks is cut every summer, and woven into the coarse cloth of which they make their tents. During the winter they live in the valley of the Indus : in the summer they move to any places where they can find grass, water, and fuel. They exchange their wool with the traders for wheat, flour, tobacco, and any thing else that they may require.

Tuesday, 15th September. To the bank of the Chokhar, or "Salt lake," distance 6 miles. The road lay towards the S. E. over a low pass with an easy ascent, but a steep and bad descent. The rock here changed from mica slate to gneiss. We halted near a small religious building on the southern end of the salt lake, which is about five miles long by three miles broad, and which was covered with thousands of wild ducks and wild geese. The water of the lake is salt and bitter, and the whole shore is covered with white banks of the saline efflorescence. Height above the sea 14,961 feet. The thermometer fell to 9° during the night. There are on all sides the clearest marks of the former higher level of this lake about 60 feet above the present surface of the water. The former extent is shown in the map by a brown shade surrounded by a dotted line.

Wednesday, 16th September. Marched 10 miles to a nameless halting place to the north of the Nakpo Gonding Pass. Road at first due east, along the southern shore of the salt lake for 4 miles ; it then crosses the stream of fresh water 10 feet broad flowing from a small fresh water lake to the south. Thence for 2 miles alternately over sandy flats, and hard caked sheets of saline efflorescence. Beyond this it lies due east for four miles over slightly undulating and very stony ground along the bank of a dry nullah, in which a few puddles of melted snow water occurred at our halting-place. The large blue hares are very common at the foot of the hills on both sides of this nullah. They have enormously long ears ; and live under the stones. I shot half a dozen in half an hour on my return at this very spot.

Thursday, 17th September. To the foot of the Nakpo Gonding Pass, distance 9½ miles. Road for the first four miles a very gradual ascent to the crest of the Poldong or Pulakonka Pass. Beyond this, at a mile and a half, we crossed the deep bed of a nullah coming from the S. W. source about 10 miles distant : thence for 4 miles the road continued to ascend over stony spurs ; passing a small stream which

comes also from the S. W. The spray of this stream was frozen in icicles over the boulders. We encamped just below the Pass at a halting-ground called Nakpo Gonding. Snow fell at mid-day and continued falling for two hours. Height above the sea, 16,225 feet.

Friday, 18th September. To Beldong near the northern end of the Chumureri lake, distance 12 miles, and half a furlong. Road at first a gradual ascent, then a descent, and a second ascent to the crest of the Nakpo Gonding Pass. Total ascent about 800 feet, and height of Pass 17,000 feet above the sea.

A few hundred feet below the Pass, on a level plain, I saw a single Kiang or wild horse; and by sending men to the right and left I was enabled to approach within 200 yards of the animal. The Kiang then moved off and I followed, and when he turned to look at me I stood still, and followed him again as he moved. After repeating this three different times I got within about 180 yards of him, and taking a steady aim, I struck him six inches behind the shoulder, the ball passing clean through him and striking the ground beyond. The animal then scampered off for about 200 yards reeled round, and fell over heavily to the ground. When I came up to him he was quite dead. The ball had passed through his heart—a lucky shot for a fowling piece at 180 yards. This animal, which is the *Equus Hemionus* of Pallas, and the *Equus Kiang* of Moorcroft, is very common about this part of the country.

From the top of the Pass the road was an easy descent for $4\frac{1}{2}$ miles to Lámzung, a halting-place on a small clear stream which feeds a salt lake lying to the eastward about 2 miles. This lake escaped the notice both of Trebeck and of Gerard, although it is about 3 miles long by $1\frac{1}{2}$ mile broad. It is called Chokhar, or the salt lake, and the salt is seen in sparkling crystals all around its edge. The people say it has no outlet, which will account for its saltiness. It has several feeders on the eastern side, besides one on the northern side.

From Lámzung a slightly undulating road for about a mile led to the Chakshang rivulet which comes from the snow to the westward and turning sharply to the southward flows into the Chumureri lake,—of which it is the principal feeder at its Northern end. A slight ascent from the Chaksang led over a low point, and the road then descended

to the rivulet again, and followed its right bank for about 5 miles to a level spot called Beldong, where we halted.

Saturday, 19th September. Marched 6½ miles to a halting-place on the bank of the Chumureri. Road for first 2½ miles very sandy as far as the lake. At 2 miles further passed the Korzo Gúnpa, or monastery, inhabited by one Lama, who resides there throughout the year. He rears some barley and turnips on the banks of the Korzo rivulet close to the lake, at an elevation of 15,000 feet above the sea. The barley had just been cut when we arrived there. It was still quite green; but there was every appearance of snow, and the Lama was afraid of losing his crop altogether. The barley looked strong and healthy but the turnips were very small and hard. The Láma informed me that even in the depth of winter the snow does not lie more than knee-deep near the monastery, a point which I am disposed to believe from what I myself beheld on the two following days; namely, that although it snowed heavily for a whole day and night at the southern end of the lake, where the snow was a foot deep; yet at the northern end near the monastery there was not even a trace of snow. This phenomenon would appear to be due to the following cause. The vast clouds which are formed on the plains of India are drifted northwards by the monsoon until arrested by the loftiest ranges of the Himálaya. The last of these mighty chains towards Ladák is that in which the Párang Pass is situated; and here the clouds discharge their contents. Beyond this lies the dry and desert country of Ladák, where water is so scarce as not to afford sufficient moisture for the formation of any extensive clouds, which will account for the little snow that falls to the northward of these great ranges.

At mid-day I placed a mark in the water to ascertain if possible whether there was any rise and fall in the level of the lake; but up to 6 o'clock in the evening and again in the morning at 6 o'clock I did not observe any perceptible change. The water of the lake was sweet to my taste, but the people of the country although they call it sweet, prefer for their own drinking that of the small snow streams which flow into the lake.—If so, it must be at its south-eastern end, as laid down by Trebeck, for I examined all the rest of the lake carefully; and had I not on the following day been obliged to return in conse-

quence of heavy snow, I should have examined the south-eastern quarter also to ascertain whether there was any visible outlet to the lake. Were there no outlet, the water would be salt as in the other lakes ; and there would certainly be considerable rise in its level during the day from the melting of the snow, and a corresponding fall at night. Dr. Gerard however declares that "whilst it is fed by several considerable streams, it has no efflux, and is kept at its level entirely by evaporation." I cannot agree with this opinion, for it appears to me that the greater the evaporation the more salt should be the water, which is not the case, as it tasted sweet to me, and Trebeck found it only brackish. The lake is 15 miles in length and from 2 to 3 miles in breadth. The water is beautifully limpid, and of a deep blue colour. I saw but few wild geese upon the lake. The mountains on both sides were perfectly bare excepting near their summits, where there were some patches of snow ; they do not appear to rise more than 3000 feet above the level of the lake.

Sunday, 20th September. Marched 10 miles and 7 furlongs to the southern end of the lake, to the bank of a small stream which joins it from the west. It began to snow about 7 o'clock, and continued snowing the whole day and night. In the morning the snow was a foot deep on the ground, and six inches thick on the roof of my tent. As the coolees positively refused to proceed any further, we were obliged to yield to them, and to make arrangements for retracing our steps. Accordingly on

Monday, 21st September, we marched to Korzo Gungpa, 13 miles over the snow : from which place I returned by the route already described, excepting that instead of visiting Rukchin, I went straight from the Chokhar, or great salt lake, to the Moré-cho ; crossing the Sápkong Pass, and halting at a shepherd's station, called Tákzüm, where I shot several hares.

On the 26th I joined Lord Elphinstone and Major Bates and marched in company with them to Simla. We crossed the Bára-Lácha Pass on the 28th of September, where it was still free from snow. On the 5th of October we crossed the Rotang Pass, on which we found fresh snow from a foot to a foot and a half in depth ; and we were just in time, for the people assured us that the Pass would be com-

pletely closed by the 5th of October. The remainder of the journey has already been described.

It may be observed that the whole of the country from Dárcha in Láhul to the Chumureri lake, is a vast uninhabited desert, without a single tree, or even a bush knee high, and but scantily supplied with water.

In conclusion I will only notice the strange belief of the Gerards that the snowy peaks to the north eastward of Piti and Láhul exceeded in height all that they had seen of the Himálayas. The Baron Humboldt (*Kosmos*, p. 45 n.) calls it an unfounded surmise, in which opinion I cordially agree: and I believe that I am fully borne out by the observations of Moorcroft and Trebeck when crossing the Kandu La (Pass) 16,600 feet in height to the south-westward of La. Moorcroft remarked that "the mountains near at hand were not much more elevated than the ghát, except one at some distance *to the west*, the peak of which was lost in clouds." Again, when crossing the Changla Pass, 17,800 feet high to the south-eastward of La, he remarked that "as far as could be estimated by the eye the line of elevation of the loftiest ridges rarely exceeded this, with the exception of the mountain descried from the Pass of Kandu La." It is needless to multiply passages to the same effect. It is sufficient that neither to the south-westward, nor to the south-eastward of La, did Moorcroft observe any peaks higher than 18,000 feet, excepting one far to the westward, which, on referring to Vigne's map, would appear to be the double-peaked mountain called Paja Huy and Dum Huy, situated in the great snowy range which divides the valley of the Chandrabhágā from that of the Indus.

MISCELLANEOUS.

1.—*Inundation of the Indus, taken from the lips of an-eye witness,*
A. D. 1842.

(Communicated by Capt. J. ABBOTT.)

Ushruff Khan, Zemindar of Torbaila, states :—"In the month of Poos (Dec.) the Indus was very low. In Maag and Phagoon (Jan. and Feb.) it was so low as to be fordable (an unprecedented phenomenon). In

Chayt it continued very low, but not fordable. In Bysakh (April) the same. About the middle of Jayt (May) 1st 1898, the atmosphere was one day observed to be very thick, the air still. At about 2 p. m. a murmuring sound was heard from the north-east amongst the mountains, which increased until it attracted universal attention, and we began to exclaim "what is this murmur? Is it the sound of cannon in the distance. Is Gundgurh* bellowing? Is it thunder?" Suddenly some one cried out, the "Rivers come!" And I looked and perceived that all the dry channels were already filled and that the river was racing down furiously in an absolute wall of mud, for it had not at all the colour or appearance of water. They who saw it in time easily escaped. They who did not, were inevitably lost. It was a horrible mess of foul water, carcasses of soldiers, peasants, war-steeds, camels, prostitutes, tents, mules, asses, trees and household furniture, in short, every item of existence jumbled together in one flood of ruin. For Raja Goolab Singh's army was encamped in the bed of the Indus at Koolaye, 3 koss above Torbaila, in check of Poynda Khan. Part of the force was at that moment in hot pursuit, or the ruin would have been wider. The rest ran, some to large trees which were all soon uprooted and borne away, others to rocks which were speedily buried beneath the waters. Only they escaped who took at once to the mountain side. About five hundred of these troops were at once swept to destruction. The mischief was immense. Hundreds of acres of arable land were licked up and carried away by the waters. The whole of the Seesoo trees which adorned the river's banks: the famous Burgutt tree of many stems, time out of mind, the chosen bivouac of travellers, were all lost in an instant. The men in the trees, the horses and mules tethered to the stems, all sunk alike into the gulf and disappeared for

* Gundgurh is a singular ridge of argillaceous schist, permeated with veins of mica, and of sulphate of lime forming a wall about 1500 feet high almost parallel to the stream of the Indus on the eastern bank. In its cavern Raja Russaloo (the king Arthur of the Punjab) imprisoned the last of the Rakhus or giant race, having slain the others. He hung up his bow at the mouth of the caveru, so that whenever the huge monster attempted to escape this memento of his terrible victor sent him back roaring with terror to his den. Many natives assure me that 20 years ago they have often heard Gundgurh bellowing, but that the sounds have ceased since then. The mountain has no volcanic rocks or lavas: yet the admission of sound by this mountain is too well attested to admit of doubt.

ever. As a woman with a wet towel sweeps away a legion of ants, so the river blotted out the army of the Raja. There were two villages upon an island opposite Ghazi. One of the inhabitants was returning from Srikote, and descending the mountain. When he came within sight of the spot where he had left all he held dear, he naturally looked with affection toward his home. Nothing was visible but a wide rushing sea of mud. His house, his friends, his household, his village, the very island itself, had disappeared. He rubbed his eyes in mortal terror, distrusting his sight, hoping it was a dream. But it was a too horrible reality. He alone of all that busy hive of moving, struggling, hoping, fearing beings, was left upon the earth."

So far the Zemindar, and to this eloquent description of an eye-witness, I need only add, that it will take hundreds, if not thousands, of years to enable time to repair with its healing hand the mischief of that terrible hour. The revenue of Torbaila has in consequence dwindled from 20,000 to 5000 rupees. Chuch has been sown with barren sand. The timber for which the Indus had been celebrated from the days of Alexander until this disaster, are now so utterly gone, that I vainly strove throughout Huzara to procure a Seesoo tree for the repair of the Field Artillery carriages. To make some poor amends, the river sprinkled gold dust over the barren soil, so that the washings for several successive years were farmed at four times their ordinary rent. It is generally believed that the accumulation of the waters of the Indus was occasioned by a landslip which blocked up the valley; but this and other interesting questions we must leave for solution to Mr. Vans Agnew, whose late mission to Gilgit promises so much to the lovers of science."

2.—*Extract of a letter from Col. J. Low.*

Penang, Jan. 10th, 1884.

"I may mention that on a cursory glance at the alphabet which you have kindly copied for me, I find several letters which I think I shall be able to identify with others in the inscriptions here. I could not manage with ink, and at last took the rather tedious and toilsome process, of copying by rule and compass.

The first inscription which I found was so copied, and forwarded to the late Mr. J. Prinsep shortly before his lamented death, so that

it is probably amongst other inscriptions (unpublished), lying in your library.* He replied saying, he should like to have a facsimile, but I don't think any one could have been more correct than the one I sent. He however lithographed the inscription with the Khulsa, which is in the face of the stone, which was apparently formerly the top of a pillar. He said it was in the Sanskrit not Pali. The style of the letter nearly that of the Allahabad, No. 2. Is not that a transition Páli? I have a copy on the other side of the water of the Journal containing *two Allahabad inscriptions*. But the last *inscription* which I discovered and copied about a year ago, is in a character somewhat older I presume. However, I have been floundering in the dark for want of the Journals containing the labours of Prinsep, Wathen, &c. &c. I will send you copies of both of these inscriptions; and, if I can manage it, of one upon a coin which I found a few months ago, but which our chief bráhman of the temple here cannot decypher. I have proved beyond doubt that there was a *Hindu* colony settled in Province Wellesley and Keddah, and I think it had been preceded by a Buddhist population. But I have not yet closed my researches, which have here to be conducted under many disadvantages (beyond our boundary), such as almost impervious jungles, a population who will afford no assistance whatever, and *Siamese jealousy*. I am engaged on and have nearly finished a paper for the Journal of the Indian Archipelago, on subjects relating more to our section of the globe than to India. But I have MSS. on my shelves, which I hope to be able to send, I will not promise very soon, to your Journal. I have been trying to get some Pali scholar, amongst the Buddhist priests, to assist me in explaining some MSS. in that language. But they are a sadly ignorant set, and even as regards their own Deity and his holy places, they are obliged to confess that I know more than they do, and that is not a great deal either.

I have little hope that the Archaeological field of Sumatra will soon be laid open. It is a sealed book. We only now want to have a collection of all the ancient inscriptions extant to the eastward, to decide, on Prinsep's system, the various periods when Buddhists and Hindus migrated there. It seems to me at present that most if not all of these

* We fear not. We have searched diligently and found none but such as have been published.—EDS.

came from Orissa or Kalinga. I cannot get Mr. Stirling's Orissa. This and the deficient pages of the Journal will be highly acceptable when procureable."

3.—*Extract of a letter from Capt. KIRTOE 22d March,*

" You express a wish to hear of my progress. I fear that I shall not this season be able to collect much, or add to the information already imparted ; in the first place, the season is too far advanced ; in the next, being entirely dependent on my own personal exertions in ferreting out curiosities, which is a work of time and chance, progress must of necessity be slow, particularly when I have so few hours daily available ; however, I got two new inscriptions at Gaya, not of much moment, and paved the way for further works ; many inscriptions are either buried in rubbish or built into walls ; I had one taken out and placed in a conspicuous position. I wish authority could be used where persuasion failed, towards having every one thus restored to view ; the expense would be very trifling, but the ignorant bigots fancy that we have some extortion in view, and are searching for money. This idea, though, appears to be vanishing. I have been for the past week engaged at Poonah and Koorkihar ; at the former place I excavated round the Buddha temple, took a correct drawing of the very elaborate north doorway and of several idols, a sketch of the entire building and a ground plan. This occupied three days, together with sundry excursions in search of sculptures, &c. I was four days at Koorkihar, and have dug out and collected ten cart loads of idols, all Buddhist, and many of the Tantrika period ; indeed I am inclined to think that they all belong to the period just before the decline of the sect. All the idols have the sentence, once or twice repeated, of "*Ye Dharma hetu probhava, &c.*" and most of them have the name of the persons setting them up ; two mention the country from whence they came ; for instance, Jessur (? Jessore), and Malaya (? Mullye) ; one mentions the fact of the party having apostatized, and again returned to the worship of Shákya, in the 19th year of the reign of *Sri Mahendra Pal Deva*. This raja is also mentioned in one of my Gonerria inscriptions on a figure of Buddha also,—it is a name new to us ; it does not occur in the Bengal list of Prinsep's tables. There are two blanks above Narrain Pal Deva, therefore he may have belonged to one of them. I at first

attached no importance to these short inscriptions ; I however fortunately copied several. I have been able to decide that Koorkihar must have been a place of Buddhist pilgrimage, and that there were rows after rows of Chaityas extending north and south for several hundred feet ; added to these, there were isolated buildings and tanks in every direction for a mile or more around. In some inscriptions the idol is called Buddha, Shákya in most, and in one, "Vir Virochna." Some of the figures are very beautiful ; one of Maya Deví is as large as life, and most beautifully executed ; the arms however are missing ; there is one extremely curious and highly finished figure of a fat old gentleman, seated on a stool, holding an egg in one hand and a lizard in the other ; one arm and the head are wanting. I have made several drawings of figures that I could not remove. I hope by collecting representations of all the Hindu and Buddhist deities to be enabled to carry out my original intention of publishing a regular pantheon, which is much needed. I am now at Nowada, and proceed to-morrow night to Giryek, where I hope to find something worthy of notice. I have heard of two mounds near Behar, where there are numerous idols above and below ground. I shall visit Uffsan, where I went last year to see the inscription and the famous idol of Varaha, with the "Rishis resting on his bristles," as described in the Vishnu Puran (see Wilson's Translation). I fear I shall have to make but a short stay this time, as I am suffering much from the effects of the sun all last week, and unless I superintend, the people will either not work or injure the sculptures ; besides, it requires contrivance to get out such masses of heavy stone out of the pits they are buried in, without the help of lever, rope or more than 4 or 5 men. I manage it by the simple though tedious process of tilting from side to side and filling in bricks and rubbish at each turn, till they are fully above ground. When above ground, the next process is to turn the block flat over, taking care to place a lump of stones or a couple of bricks exactly under the centre ; this forms a fulcrum on which a child may move the largest stone, and by the same means of placing bricks under, it is set upright, and thus let backwards unto the cart.

I visited Tupobun. There are five hot springs, the hottest only 110° ; there have been a couple of temples, but nothing but a few broken idols and heaps of rubbish remain ; there is a modern Shiwalla."

4.—Daily rate of Evaporation in Calcutta.

On the chance of its proving serviceable to some speculator in meteorology, we place on record the subjoined statement of the daily rate of evaporation in Calcutta for the year 1845. The instrument employed was that described in Volume XIV. page 213; it was freely exposed in an open verandah to the influence of the atmosphere, sheltered, however, from the direct rays of the sun.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	.049	.022	.075	.071	.060	.076	.029	.032	.015	.074	.050	.055
2	.65	.42	.78	.62	.62	.62	.43	.33	.49	.82	.58	.56
3	.66	.50	.74	.46	.54	.43	.42	.38	.55	.81	.54	.60
4	.61	.54	.90	.43	.62	.53	.37	.36	.63	.73	.56	.54
5	.61	.55	.90	.31	.67	.46	.43	.35	.40	.62	.62	.50
6	.50	.84	.83	.43	.77	.54	.42	.36	.31	.43	.63	.43
7	.52	.93	.77	.53	.98	.63	.51	.22	.45	.52	.66	.51
8	.55	.90	.78	.56	.69	.55	.61	.20	.34	.54	.61	.23
9	.55	.84	.76	.66	.96	.47	.39	.26	.32	.68	.61	.76
10	.66	.82	.80	.30	.87	.51	.23	.21	.44	.77	.64	.53
11	.65	.74	.63	.51	.78	.34	.25	.21	.50	.75	.55	.50
12	.66	.76	.73	.60	.74	.48	.37	.30	.55	.45	.56	.58
13	.59	.83	.97	.60	.66	.49	.26	.17	.40	.42	.65	.62
14	.64	.84	1.00	.61	.81	.44	.23	.28	.23	.61	.64	.67
15	.51	.83	1.00	.56	.65	.54	.28	.19	.46	.58	.64	.53
16	.55	.86	1.05	.56	.64	.78	.34	.20	.42	.39	.56	.42
17	.37	.77	.73	.76	.64	.77	.40	.29	.54	.20	.57	.20
18	.43	.61	.72	.77	.66	.70	.37	.31	.39	.19	.56	.12
19	.43	.28	.85	.69	.93	.65	.29	.44	.47	.17	.64	.28
20	.55	.44	.96	.61	.94	.59	.35	.36	.52	.15	.52	.39
21	.62	.70	.96	.63	.77	.58	.38	.42	.47	.25	.50	.46
22	.45	.57	1.02	.85	.76	.46	.37	.35	.31	.46	.57	.40
23	.46	.76	.87	.77	.67	.48	.29	.38	.53	.30	.57	.38
24	.56	.70	.86	.78	.17	.46	.34	.43	.58	.46	.50	.52
25	.51	.71	.89	.82	.36	.21	.54	.43	.58	.47	.50	.51
26	.48	.81	.84	.45	.65	.21	.55	.44	.61	.30	.50	.46
27	.61	.80	.75	.48	.54	.40	.38	.44	.51	.58	.55	.44
28	.58	.89	.86	.77	.47	.31	.30	.28	.78	.52	.50	.40
29	.52	..	.88	.57	.38	.26	.24	.29	.63	.55	.42	.35
30	.31	..	.82	.66	.45	.19	.24	.33	.65	.68	.51	.59
31	.39	..	.85	..	.50	..	.24	.36	..	.52	..	.52
Ave- rage.	.537	.695	.714	.602	.650	.494	.358	.315	.373	.515	.565	.468

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MARCH, 1848.

The usual monthly meeting of the Asiatic Society, was held on the evening of Wednesday, the 8th of March, 1848.

J. W. COLWILE, Esq. President, in the chair.

The proceedings of the last meeting were read.

The accounts and vouchers for February were produced.

Dr. Falconer, B. M. S. and C. Huffnagle, Esq. M. D., Consul to the United States of America, having returned from Europe, were replaced on the list of subscribing members.

Charles Gubbins, Esq. C. S. was proposed for election as an ordinary member—proposed by Mr. Hume, seconded by Mr. Heatley.

Lieut. R. McLagan, B. E., Principal of the College of Civil Engineers at Roorki, was proposed by Dr. Falconer, seconded by H. M. Elliot, Esq.

Babu Ramaprasad Roy, and Raja Ramchand Singh, proposed by Mr. Laidlay, seconded by Dr. O'Shaughnessy.

Read a note from the Rev. Jas. Thomson, tendering his resignation as a member of the Society.

From Major Macleod, Madras N. I., to the same effect.

From Major Baker, B. E. withdrawing temporarily, on account of his leaving India on furlough.

From G. A. Bushby, Esq. Secretary to Government of India, Home Department, forwarding despatch from the Court of Directors, containing instructions for the guidance of the Thibet Mission.

Financial Department.—(Statistical.)

No. 37 of 1847.

Our Governor General of India in Council.

1.—You having determined to despatch a Mission to Thibet with a view to scientific as well as to other objects, we desire to direct your attention to the expediency of the opportunity being made available to the collection, as far as practicable of every species of information connected with the state, resources, and capabilities of the countries visited.

2nd.—It will be unnecessary that we should here enter into minute details as in our Despatch in this Department dated the 3rd June, No. 6 of 1846, we have given a general enumeration of the chief subjects of statistical inquiry, and prescribed rules for the guidance of those engaged in such inquiry within the territories under our administration. These rules and suggestions will be equally applicable to inquiries of the like nature prosecuted in other countries, and we wish them to be brought prominently to the notice of the members of the Mission.

3rd.—With regard to the collections in Natural History, we have given full general instructions in our Despatch in the Public Department, dated 16th, September, No. 17 of 1840. To this Despatch, and more especially to para. 8, we refer you for information on that point.

4th.—As it may be desirable that the members of the Mission should be apprized of the deficiencies of our Museum, in order if opportunity offers that they should be supplied, we forward in the packet a catalogue of Mammalia and birds of Nepaul and Thibet, underlined, so as to point out desiderata; together with an explanatory Memorandum relating to these and other branches of science.

We are, &c.

(Signed) H. St. George Tucker,	(Signed)	John Loch,
J. L. Lushington,		John C. Whiteman,
W. Wigram,		Wm. J. Eastwick,
Russel Ellice,		A. Shank,
John Cotton,		A. Galloway,
E. McNaghten,		W. H. C. Plowden,
Ross D. Mangles,		Henry Willock.

London, the 17th November, 1847.

MEMORANDUM,

With reference to the Mission to Thibet, attention should be called to the importance which the Court attach to the labours of the scientific department

of this mission. Although ample instructions have doubtless been given to the members of the Mission relative to all branches of science, which may present themselves for observation, it may be useful to enumerate a few points which have an immediate reference to the interests of the Museum of Natural History in this House.

The higher regions of Central Asia, and especially Thibet, possess a peculiar character with regard to their Zoological productions, and opportunities to examine and collect these have hitherto been extremely rare. Among the branches to which the particular attention of the Mission should be directed, are the Mammalia, Birds and Insects of Thibet, and the other elevated regions which may be visited by the Mission.

Of Mammalia, some species are known to be peculiar to the higher regions, or are rarely found in Bengal and the plains of India. The most important of these, so far as hitherto observed, are enumerated in the annexed list—"A Catalogue of Mammalia and Birds observed by B. H. Hodgson, Esq. in Nepaul and Thibet," in which the names of the species most desirable for the Museum are underlined is also sent for the assistance of the members of the Mission.

Of the Birds of Thibet and Central Asia, a general collection will be desirable, as they possess, as well as the Mammalia, a peculiar character, and most of them are as yet imperfectly known. Those birds however, which are also found in the lower regions of Bengal, should only be noticed in the Journals, as the collecting them would unnecessarily encumber the Mission.

The Pheasants of Thibet demand particular attention; many of them are of great beauty and rarity. Among these we notice especially the—

Crossoptilon auritum of Hodgson, and the

Thaumalia Amherstiae, and

Thaumalia Picta, which are enumerated in the 124th page of Hodgson's Catalogue.

All these are desiderata in the Museum. and several specimens of each are wanted.

In this department also attention should be drawn to the species underlined in the accompanying Catalogue.

The opportunities which will be enjoyed by the Mission should be extended to the collection of the Insects of Thibet, and especially the Coleoptera and Lepidoptera, which are likewise of great interest, and as yet but little known, and it is strongly recommended that a competent Native Taxidermist may be attached to the mission for the especial purpose of collecting and preserving specimens of Natural History for the Museum.

*List of Mammalia found in Thibet and the higher regions of Central Asia,
which are desiderata in the East India Company's Museum.*

- See Hodgson's Catalogue, p. 2 *Macacus* (*Pithex*) *pelops*, *Hodgs.*
 „ pp. 2, 3, 4 *Vespertilionidæ*; all the species of this family;
 „ „ Family *Felidæ*, all the smaller species.
 „ p. 5 *Felis Macrosceloides*, *Hodgs.*
 „ „ „ *Moormensis*, *Hodgs.*
 „ 6 *Leopardus celidogaster*, *Temm.* } especially.
 „ „ „ *Elliotti*, *Gray.*
 „ 8 *Linsang pardicolor*, *Gray.*
 „ „ „ *Urva cancrivora*, *Hodgs.*
 „ 9 *Paguma* (*Paradoxurus*) *Grayii*.
 „ „ „ *Paguma*? (*Paradoxurus*) *laniger*, *Gray.*
 10 *Paradoxurus Bondar*, *Gray.*
 „ 12 *Vulpes montanus*, *Pearson.*
 „ 12 *Martes*? *Toufaus*, *Hodgs.*
 „ 13 *Mustela Canigula*, *Hodgs.*
 „ „ „ *Cathia*, *Hodgs.*
 „ „ „ *Helictis Nipalensis*, *Hodgs.*
 „ 15 *Ursus Isabellinus*, *Horsf.*
 „ 16 *Talpa Micrura*, *Hodgs.*
 „ „ „ *Sorex Nemorivagus*, *Hodgs.*
 „ 17 *Mus Bandicota*, *Bechst.*
 „ „ „ Muridæ; all the species of this family.
 „ 19 *Nesokia Kok*, *Gray.*
 „ „ „ *Hydrophila*, *Hodgs.*
 „ 22 *Lepus Oemodus*, *Hodgs.*
 „ „ „ *Lagomys Nipalensis*, *Hodgs.*
 „ 23 *Artomys Bobac*, *Gmel.*
 „ 24 „ „ *Tibetanus*, *Hodgs.*
 „ „ „ *Rhizomys badius*, *Hodgs.*
 „ 26 *Kemas Hodgsoni*, *Gray*, the *Chiru*.
 „ „ „ *Tetracerus quadricornis*, *Gray.*
 „ 31 *Moschus chrysogaster*, *Hodgs.*

Of the Ruminant genera, *Cervus*, *Antelope*, &c. such species as are not found in the lower regions.

(True Copies.)

G. A. BUSHBY,
Secretary to the Government of India.

With regard to the appropriation and distribution of specimens of Natural History in all Departments, which may be collected during the Mission to Thibet, reference will doubtless be made to the instructions on this subject in the Court's Public despatch No. 17 of 1840, to the Government of India, dated 16th September.

Meteorological and Zoological phenomena will necessarily engage the attention of the Mission.

East India House, November, 1847.

From G. A. Bushby, Esq. Secretary to Government, forwarding the directions of the Governor General in Council for the immediate return of the Report and drawings of the cave Temples of Kalinjar and Shapuri, south of Chunar.

The Secretary stated that on receipt of Mr. Bushby's despatch, a representation was forthwith made by the President to the Governor General, as Patron of the Society, showing that the MS. and drawings were actually in the artist's and printer's hands, and soliciting permission to retain these till completed for publication, which request was graciously acceded to by His Lordship.

From C. W. Montrou, Esq. in charge of Observatory, Colaba, forwarding, by order of the Government of Bombay, a copy of the Magnetical and Meteorological observations made at Colaba in 1845.

From G. A. Bushby, Esq. forwarding a copy of the 7th volume of the Madras Astronomical observations.

From Dr. Hooker, Honorary Member of the Asiatic Society, describing a brilliant Aurora observed by him at Barroon, east bank of the Soane, on the evening of the 14th of February, 1848.

*Barroon East bank Soane River,
February 14th, 9 p. m. Bar. 29° 924.*

Temp. air, 62; Wet Bulb, 51·5; Grass 53. Calm, clear, horizon; sky blue-grey; moon and stars clear; milky-way and zodaical lights invisible.

Moon's light by Photom. 3·07 inch, (sun at 3 p. m. 4·17 inch by same.) Observed a well defined auroral arch, 12° broad, its upper limb well defined alt. 20°. Extremes bearing West 20 South, and North 50 East, light pale but clear and bright. Lower limb resting on an arch as dark as the sky at zenith. Beams very numerous and crowded; principal ones about 30, all linear and lance-shaped, crossing the zenith and meridian and converging on opposite horizon towards South 15 East; all the beams, bright, clear, well

defined, pale yellow, moving slowly, forked at their apices, or split from their apices towards the zenith, almost obscuring stars of the first magnitude. Longest beams terminate at South 10 East; alt. 25°. Middle beam broad crossing the zenith, and descending to North 50 East, at alt. 40°. Northerly beams almost parallel to horizon, terminate at South 70 East: alt. 20°.

10 p. m. General appearance more diffused, upper limb of arch less clearly defined. No beams cross the zenith, two detached ones bear South 15 East at 15° alt. a beam occasionally re-appears at zenith.

10.15. Appearances to West of North as before. One beam on zenith; two cross the Meridian, one to South 30 East at 15° alt. which is not continuous towards the arch in South East. Arch more diffused, forming a mass of pale light from Horizon to alt. 25°. Beams broader, shifting and splitting more frequently; soon after a dark horizontal band 4° broad crosses the arch, extending North 55 West, to North 10 West to upper limb, alt. 12°; it appears as a break in the auroral arch; whole Horizon covered with a pale diffused light, strongest below arch, and in opposite quarter of heavens beams still clear, the lateral broadest and best defined. The dark band becoming broader, and breaking at the arch.

10.30. Beams from arch still clear, linear, 2°—6° broad, about 12 in number, none reach the zenith:—a few lateral ones cross the moon's Meridian, the upper approach within 8° of her orb, and still are well defined; North East beams and most crowded North West broadest and most clearly defined. The dark band becomes broader, and divides the auroral arch. Whole phenomena fading, the longest, brightest and most numerous beams extend along the North East horizon.

10.50. Still fading, beams and arch all disappearing to West of North, 18 narrow beams between North and North 20 East from broken remains of arch—cold southerly breeze springs up.

10.55. Breaking up fast.

11 p. m. Diffused light over all horizon, scattered fragments of beams in various parts of heaven, like cirrus, linear and best defined along and parallel to North and North East horizon.

Mid-night. Two faint beams to North-East and two strongly defined lance-shaped ones parallel to each other, to South-West.

The following day was bright, clear and warm.

From Capt. Jas. Abbott, forwarding an account, by an eye-witness, of the terrible Cataclysm of the Indus. (Published in the present number of the Journal.)

From Major Madden, Almorah, with reference to his promised essay on the Flora of Kumaon.

From the Rev. Mr. Keane, requesting information as to the site of Interjalie, and giving a brief account of the late earthquake as experienced at Chapra, Kishnagur.

From Mr. Mansel, regarding the Taj model in the Museum, for which Mr. Mansel proposed a glass case to be provided. Ordered accordingly—and the thanks of the Society voted to Mr. M. for his liberality in restoring the Taj model without charge.

From Baboo Pearymohun Sen, apologising on the part of the Cameron Testimonial Committee for their having called a meeting at the Society's House without having asked permission.

From Capt. J. D. Cunningham, transmitting an account of the ruins at Putharee, near Oudehpoor. (Ordered for publication.)

From Col. Low, Penang, relative to the inscriptions of supposed Hindu origin at Penang and in Sumatra. (Published in present number of the Journal.)

From the Hon. Col. Butterworth, to Mr. Laidlay, promising to send the fragments of the Singapore inscription to the Museum of the Asiatic Society.

On the analysis of a coal from the Punjab, by Dr. Andrew Fleming, communicated by Mr. Laidlay. Mr. Elliot stated that Dr. Fleming had been appointed by Government to make a survey of the district from which this coal was obtained, and he suggested that the publication of Dr. Fleming's paper be postponed till the receipt of his further report.

From a member of the Asiatic Society, forwarding four copies for the Library, of a Sanscrit Tract, entitled "Sri Yeshu Khrista Mähatmyam."

From Mr. C. Govindrow, Khandeish, Dhoolia, inquiring as to the possibility of obtaining copies, printed or MS. of several volumes of the Mackenzie MSS. The Librarian having been referred to, reports that there are 32 folio vols. of the MS., the whole of which may be copied for about 1000 Rs.

From the Prince Gholam Mahomed, announcing the proposed publication of a memoir by himself, in English and Persian, of the life of Hyder Ali Shah. Price of Persian copy 12 Rs.; English translation 6 Rs. The letter having been referred to the Oriental Section and favorably reported on, it was stated by Mr. Elliot, that since that re-

port was drawn up, it had become doubtful whether the work was not a mere reprint of one containing invectives against the British Government which the Society might not wish to approve of; the subject was accordingly again referred to the Oriental Section.

Read a report from the Oriental Section, as follows:

To W. B. O'Shaughnessy, M. D. Senior Secretary, Asiatic Society. -

Sir,—I am directed by the Oriental Section to acknowledge the receipt of your letter of the 21st, and in reply to convey to you, for the information of the Council, the suggestions of the Section concerning the subjects about which their opinion has been asked by the Council.

2. The Section recommend, that of such works of Moolavee Abdullah as are not in the Library of the Society and as are of real value, one copy should be taken in exchange for publications of the Society. The Section will forward to the Council as soon as practicable a list of those works that deserve a place in the Library.

3. The Section think the work of Prince Gholam worthy of the patronage of the Society, but would first request Prince Gholam to mention his price, before they can propose the number of copies to be subscribed for by the Society.

4. With regard to the publication of the life of Timur by the Society, the Section beg to suggest that Major Anderson be solicited to favour the Society with a report on the contents and merits of the work, to be circulated, together with the entire MS. through the Section. As there exists already a translation, although abridged, of this work by P. de la Croix, the Section are not able to pass an opinion about the expediency of its publication before the MS. is laid before them.

5. The Section recommend, for the approval of the Council, to publish as the second work in the Oriental Journal, the Brihadáranyaka Upanishad, with the commentary of Sankara Achárya, and the gloss of Anandagiri. His Upanishad is not yet published, and is one of the most important and extensive. At the same time the edition of this Upanishad would accord with the wish of Professor Wilson, forming, as it does, a considerable portion of the Sata Patha Bráhmaṇa, the publication of which he suggested to the Society.

I have the honour to be,

Sir,

Your most Obedient Servant,

E. ROER.

Secretary, Oriental Section, Asiatic Society.

Asiatic Society, the 29th Feb. 1848.

Resolved, that the Report be adopted and its suggestions carried into effect, with the exception of the part referring to the history of Hyder Ali, reserved for further consideration.

Read a note from Dr. Falconer, regarding a collection of shells presented to the Society by Mr. Cuming in 1843, and for which no return had been made. At Dr. Falconer's desire the consideration of this letter was remitted to the Council and the Section of Natural History.

From Lieut. Grant, Adjt. 27th Regt. N. I. announcing the arrival of a sculptured stone sent by Capt. Davidson, on the part of Dr. Spilsbury, for the Museum of the Society.

From F. Edward Hall, Esq. regarding Tarkiras of the Persian, Hindi and Urdu poets, to which he is desirous of directing the attention of the Society. Referred for Report to the Oriental Section.

The Secretary stated that the proposition made and seconded at the last meeting for the election of Professor Henry of Princeton University as an Honorary member of the Society having been considered by the Council, he was directed to report it had been approved of and recommended to the adoption of the Society.

Dr. Falconer objected to the election as irregular, on the ground that no detailed statement of Professor Henry's claims for this honor had been submitted to the Society, and he proposed that the election be postponed.

Dr. Walker supported Dr. Falconer's proposition.

The Secretary stated that Professor Henry was proposed for election exactly in the same manner as all Honorary members had been elected for eight years past. He had been proposed and seconded at one meeting; the proposition referred to the Council, who had directed the Secretary to communicate their approval of it to the Society, as was now done; no detailed statement of claims and scientific services had ever been given or sought in previous instances. Dr. Henry's discoveries and contributions to our knowledge of Electricity, Magnetism, and Meteorology, were familiar to every one, and he hoped that the meeting would not delay the election lest their doing so might be deemed a slight to one of the most amiable and eminent philosophers of the day.

The proposition for Dr. Henry's election having been put to the vote Dr. Henry was elected by a show of hands and by a large majority an Honorary Member of the Asiatic Society.

A note was read from Mr. Piddington, apologizing for his absence on account of illness.

The Curator of the Zoological Department read a descriptive list of additions to the Museum during the past month.

LIBRARY.

The following books have been received since the last meeting.

Presented.

Zakarija Ben Muhammed Ben Mahmud el Cazwini's Kosmographie,
Edited by Ferdinand von Wüstenfeld. Erste Halste.—BY THE
EDITOR.

Jahresbericht der Deutschen morgenlandischen Gesellschaft für 1846.—
BY THE EDITOR.

Meteorological Register kept at the Surveyor General's office Calcutta, for
the month of January 1848.—BY THE DEPUTY SURVEYOR GENERAL.

The Oriental Baptist, No. 14.—BY THE EDITOR.

The Upadeshak, No. 14.—BY THE EDITOR.

The Calcutta Christian Observer for February 1848.—BY THE EDITORS.

Proceedings of the Academy of Natural Sciences of Philadelphia for May
and June 1847.—BY THE ACADEMY.

Nityadharmaṇuranjicá, Nos. 51, 52.—BY THE EDITOR.

Tatwabodhiní Patricá, No. 55.—BY THE TATWABODHINI SABHA.

Proceedings of the Royal Astronomical Society, Vol. VII. Nos. 1—7.—BY
THE SOCIETY.

Bulletin de la Societe de Geographie, Tome VII.—BY THE SOCIETY.

Quarterly Journal of the Geological Society, No. 12.—BY THE SOCIETY.

Memoirs of the Royal Astronomical Society, Vol. XVI.—BY THE SOCIETY.

Astronomical Observations made at the Hon'ble East India Company's
Observatory at Madras, 1843—44.—BY THE GOVERNMENT OF INDIA.

The Pilgrimage of Fa Hian, pp. 1—24.—BY THE TRANSLATOR.

Bombay Magnetical and Meteorological observations made at the Observatory at Bombay, from April to December 1845.—BY THE GOVERNMENT OF BOMBAY.

Zeitschrift der Deutschen Morganlandischen Gesellschaft—Herausgegeben
von den Geschäftsführern. Heft III. and IV.—BY THE EDITOR.

Exchanged.

The Athenaeum, Nos. 1047—1051 to 53.

Journal of the Agri-Horticultural Society of India, Vol. VI. Part II.

The London, Edinburgh and Dublin Philosophical Magazine, Nos. 210-11.

Purchased.

The Annals and Magazine of Natural History, Nos. 135—36.

Journal des Savants, Oct. 1847.

Comptes Rendus des Séances de l'Academie des Sciences, Tome XXV. Nos. 17—21.

Donation to the Museum of Antiquities.

A Nepalese Sword.—By SAMUEL WRIGHT, Esq.

Certified to be a true Report,

JAMES W. COLVILE, *President.*

W. B. O'SHAUGHNESSY, *Secretary.*

*Report of Curator Zoological Department.**

The following are the presentations I have to record this evening :—

1. Sir W. Jardine, Bt. A small collection of British mammalia and birds, comprising a very fine example of the rare British Wild Cat (*Felis catus*, L., as currently assigned, v. *F. sylvestris*, Aldrovand), procured in Inverness-shire; —also two Alpine Hares,—specimens of *Arvicola glareola*, (Schreb., v. *riparia*, Yarrell, &c.),—a fine cock Pheasant,—some Black and Red Grouse,—and sundry small birds. On comparison of the Cat with the imperfect skin from Afghanistan noticed in XIV, 342, XV, 169, the latter differs in having shorter fur, of a more fulvescent hue, especially on the under-parts and limbs, with the markings more broken into spots, though still tending to form irregular obliquely transverse stripes; the tail, also, if perfect, would seem to be tapering (as in the domestic Cat), and has its black tip less developed. The two are, however, very closely allied, and both may have, at least partly, contributed to the origin of the domestic Cats of their respective regions. The fine Scottish specimen before the Meeting, recalls vividly to mind the figure and expression of a large European male Cat, as distinguished from the more slimly formed domestic animal of this country, which (as I have been informed on good authority) occasionally interbreeds with the common wild *F. chaus*. Mr. Walter Elliot, again, informs me that he has known the wild *F. rubiginosa* of the Coromandel coast to interbreed with the domestic

* Presented at the February meeting.

Cat; and that a brood of semi-wild hybrids thus produced occasioned him at one time much inconvenience. In connexion with these facts, we cannot but observe the remarkable coincidence of the defective tail of the wild Malayan *F. planiceps*, and of the domestic Cats of the same countries (vide XV, 245).*

* It is probable that this variation likewise occurs in the very nearly allied, but considerably larger, *F. Temminckii* of the Malayan peninsula, &c.; from which it does not appear that *F. moormensis* of Nepal and Sikkim differs in any respect. I have examined specimens of both, the former from Malacca, the latter from Sikkim, but have never had the opportunity of actually comparing them together.

On the subject of *Canine* hybrids, there is an interesting paper, as recording some observed facts, in the 'Calcutta Sporting Review' for December 1847; but the writer makes a great mistake in supposing that the rufous 'Wild Dog' (so called) of India and the Malay countries—*C. rutilus*, v. *Cuon primævus*, &c. &c.—has contributed largely to the origin of domestic Dogs, as not a single variety of the latter is known to want the second true molar in the lower jaw, as in the wild species referred to; and he falls into a still greater error in supposing that the *Hyæna* could interbreed with any *Canine*, its generative organs being on a different type, and the mode of copulation consequently not exhibiting the peculiarity observable in *Canis*. The dentition, too, is widely dissimilar; and other important diversities might be enumerated. The affinity of *Hyæna* is with the *Viverridae*, and not with the *Canidae*.

Some experiments which I have been trying with the hybrid race produced by the male *Gallus Sonneratii* and picked common hens, have hitherto led to opposite results to what have followed the intermixture of different Canines. The male hybrid was particularly salacious; yet though a great number of eggs have been produced by hens trodden by him, of the pure domestic fowl, as well as of his own hybrid race, not a single one has hatched, while other eggs placed with them produced chickens. I am now keeping the only remaining hybrid hen with a Burmese domestic cock, but very little removed from the wild *bankivus*; and she has already produced some more eggs. In the London Zoological Gardens, some ten years ago, was a brood of $\frac{1}{2}$ bred birds between the English Pheasant and common Fowl, these being $\frac{1}{2}$ Pheasant: and if this be possible, surely two different species of true *Gallus* ought to produce fertile hybrids, at least with either parent race, if not *per se et inter se*. While on the subject of hybrids, I may here notice that my friend, C. S. Bonnevie, Esq. of Rungpore, some time ago presented me with a living specimen bred between the male Guinea-fowl and common hen, which is now preserved in the Society's Museum. Two other hybrids thus produced have since been described in the 'Proceedings of the Academy of Natural Sciences of Philadelphia' for Sept. 29, 1846, p. 101. The Society's bird is almost wholly white, but a few coloured feathers it has show no trace of the Guinea-fowl spots, observable in those described by Dr. Morton: the bill and feet of the specimen, however, and its voice and carriage when alive, partook very much of the Guinea-fowl: it has no trace of comb, nor of the Guinea-fowl bony knob, and but very slight wattles depending from the angle of the gape. The most curious bird hybrid I have seen was one bred in the Garden of the Zoological Society, between the *Chenaloper egyptiacus* and that singular variety of domestic Duck common at Manilla, which is known as the "Penguin Duck."

2. The Rev. F. Mason, Maulmain. Two packages, by successive arrivals of the steamer, containing a number of flat skins of birds. Among them is the *Crypsirina varians* (v. *Phrenotrix temia*, Horsfield), which would seem to be of common occurrence in the Tenasserim provinces, where its presence was first remarked by the late Dr. Helfer. Also a new species of Shrike, which our taxidermists have fortunately been able to set up, and which may be thus described :—

Lanius hypoleucus, nobis. Very closely allied to *L. Hardwickii*, Vigors ; from which it differs—1, in having the entire crown nigrescent, passing gradually from the black of the forehead to dark ashy on the nape ; the ear-coverts being uniformly coloured with the feathers superio[r]ly adjacent :—2, in having the rump and upper tail-coverts of the same deep maronne colour as the back and scapularies :—3, in the much greater development of the ferruginous margins of the great wing-coverts and tertiaries :—and 4, in having the under-parts uniformly white, a little subdued, and tinged with a very faint blush, but having no trace of rufous on the flanks and elsewhere.

3. R. Templeton, Esq. M. D., Colombo, through W. Elliot, Esq. Madras. Two living Monkeys, viz. a young male of *Macacus sinicus*, Desm. (v. *pileatus*, Lesson), and a young female of *Presbytis cephalopterus*, (Zimm.), of the normal colouring. Pl.—represents three varieties of colour of the last named species, with a figure of the allied *Pr. Johnii* of the Nilgherries, in the distance.*

4. Walter Elliot, Esq. Madras. A living specimen of a Cat, for inspection ; and a stuffed Dolphin procured in the Bay of Bengal. The former is of the species described by Mr. Elliot, as the *Wagati* of the Mahrattas of the Ghâts, in the 'Madras Journal of Literature and Science,' X, 108, and since termed *Leopardus Ellioti* by Mr. Gray, who identifies it with *Felis nipalensis*, Hodgson. Of this, which I regard as *F. bengulensis*, Pennant, the Society's museum contains a fine series ; and I consider Mr. Elliot's animal to be decidedly of the same

* The *Pr. thersites*, described in my Report for last November (XVI, 1271), inhabits the low country of the northern half of Ceylon, and is therefore probably distinct from the very large Monkey, of a dark colour, which Major Forbes remarked " at Newerra Elia, and scattered over the colder parts of the island." The adult male of *Pr. thersites* sent by Dr. Templeton was savage or rather uncertain in its temper for some time after its arrival ; but to myself and others he knows, he is now quite gentle and extremely fond of being caressed. This has enabled me to examine him more particularly ; and I find that he has not the radiating centre of hair above the brows, observable in the other *Entelloid* Indian Monkeys, while the hair of the crown is particularly dense and *touffu*, though without rising into a crest. His coat generally is dense and somewhat peculiar ; very unlike that of *Pr. entellus*, but approaching that of *Pr. anchises* of the central table-land of the peninsula. Fig. 3 of Pl.—, with outstretched legs, represents a very characteristic attitude of *Pr. cephalopterus* ; and fig. 1 exhibits the normal colouring of the species.

species, and its spots (of a somewhat bolder pattern than occurs in the generality of the species from the sub-Himalayan region, Assam, Sylhet, and Arracan,) are more filled out with black than I remember to have seen before: but I can detect no further difference. It would be of some interest to obtain this species (or its representative) in the Tenasserim provinces; in order to observe whether it graded into *F. jaramensis* of the Malayan peninsula, which is considered the same by M. Temminck who unites them under the name *F. minuta*, in which he is followed by Dr. Schlegel and others.

The Dolphin, which Mr. Elliot inclines to regard as a new species, and terms *Dolphinus perniger*, approaches very closely in size and proportions to *D. hastatus*, F. Cuv., *Hist. des Cétacés*, p. 161, and to which this author refers the *Grampus Heavisidii* of Gray; but there is no trace of the peculiar markings of the under-parts which distinguish the Cape species referred to. Mr. Elliot, describing the fresh animal (as I presume), mentions it to be "uniform shining black above, blackish beneath. It has a series of 26 teeth on each side, above and below; conical, obtuse, and slightly curved inwards." The animal is well stuffed; and now measures 5 ft. 4 in. in total length (to middle of tail), the beak (to frontal elevation) 4 in.; dorsal fin situate posteriorly to the middle of the body, commencing at a distance of 29½ in. from the tip of the beak; length of its upper margin (in the dry specimen) 10½ in., and height about 6 in.; length of the flipper 10 in., and extreme breadth 4 in.; spread of the tail-flukes 14½ in., and these are divided apart to a depth of 1½ in.; beyond this division, a very distinct ridge or keel is continued for about 1 ft., attaining a maximum elevation of about ¾ in. These are about all the specific distinctions that can be drawn from the dry specimen.

5. Capt. Scholefield, of the Schooner "Sydney." A dead female *Ursus malayanus*, from Java. Perfectly identical, as a species, with specimens from Assam, Tenasserim, &c.; but the individual remarkable for two great black patches occupying much of the right side of its U-like mark on the chest, and for numerous small spots spread over the remainder of the same mark. It has been set up as a stuffed specimen.

6. From the Barrackpore menagerie. A very fine dead specimen of *Phasianus torquatus*, mas.

7. Mr. Geoffrey Finch. A living albino of the common larger Mongoose of Bengal (*Mangusta grisea*).*

8. L. Manley, Esq. A dead African Finch, in perfect plumage, the *Crithagra chrysopogon*, Swainson, v. *Fringilla butyracea*, var., Latham. Though in the ordinary full plumage of the male bird, this specimen proved, upon examination, to be a female.

* Since dead, and mounted in the Museum.

9. Mr. J. H. Howell, of the Pilot Service. Some fine specimens of water-snakes, and a few fishes, procured at the Sandheads.

10. Mr. J. T. Babanau. Two fœtuses of the wild Sow.

11. Mr. E. Lindstedt. A collection of several species of Snakes, from Malacca.

12. Baboo Rajendro Mullick. Two specimens of *Strix flammea*, and a dead white Guinea-fowl : the latter, however common in Europe, is held in some estimation by the native gentlemen who keep collections of living animals.

13. Mr. C. Bell, of the Preventive Service. A dead King Parrot (*Aprosmicetus scapulatus*).

14. Mr. W. E. Templeton, Assistant in the Museum. A specimen of the American *Gallinula (?) martinica*, (L.)

15. R. W. G. Frith, Esq. A dead English common hen, with large spurs ; also the skin of a very interesting species of *Rhinolophine* Bat, which I can only classify as a new generic form, by the name

Calops, nobis. General character of *Rhinolophus* and *Hipposideros*, but the tail and *calcanea* wanting, and the inter-crural membrane acutely emarginated to the depth of an even line with the knees. Ears delicate, large, broad, and rounded ; continued round to the front, without a trace of emargination separating an *anti-helix*. Facial pit surmounted by a small field, divided by a raised medial line, and above this projects a small crest of membrane, having an abruptly rising, obtusely bifid tip, which is bent forward : behind this membrane, a minute pencil of hairs indicates the position of the sac observable in *Hipposideros* : each nostril is surrounded by a slight fringe of membrane ; and a broader fringe borders the facial cavity in front, impending the upper lip ; but the sides of the facial cavity are densely fringed with hair only ; and the fur is long and dense upon the forehead. The teeth cannot be examined without sacrificing the unique specimen. The proportions of the wings, and the development of the ante-brachial membrane, are the same as in *Nycteris*. The fur is long, and delicately fine, as in true *Rhinolophus*.

C. Frithii, nobis. Length, from nose to rump, about $1\frac{1}{2}$ in. ; of the middle of the inter-crural membrane but $\frac{1}{2}$ in. ; head $\frac{3}{4}$ in. ; ears posteriorly $\frac{1}{2}$ in., or somewhat less ; fore-arm $1\frac{1}{2}$ in. ; shank $\frac{1}{2}$ in. ; foot with claws $\frac{1}{2}$ in. ; longest finger $2\frac{1}{2}$ in. Colour dusky or blackish, the fur tipped with dull ashy-brown above, and with paler and somewhat albescent ashy below : the membranes fuscous. Inhabits the Soonderbuns of Lower Bengal.

It is somewhat remarkable that I have not yet succeeded in obtaining a single fresh specimen of a *Rhinolophus* or *Hipposideros* in Lower Bengal ; and the only additional Indian species I know of, to those enumerated in XIII, 480 *et seq.*, is a *Hipposideros* thus described to me by Dr. Templeton of Ceylon, together with a notice of a species according very well with *H. speoris*.

Hipposideros ater, Templeton. "Resembles the other" (*speoris?*) "in every thing but size and colour. The back is coal-black, the hair near the body dark silvery-grey; belly greyish-black; the membrane deep black: tail one-half longer than the femora, its tip exserted. Length 1 $\frac{1}{2}$ to 1 $\frac{2}{3}$ in.; expanse 10 to 10 $\frac{1}{2}$ in.; tail 7 to 8 in. Common in old buildings about Colombo."

Among the gatherings of the past month, may be noticed particularly two remarkably fine specimens, male and female, of half-grown Orang-utans, picked up (when but just dead) after having been thrown away into the streets. These have been stuffed, and now replace the specimens of corresponding age, but not nearly in such fine condition, that we possessed previously.

Also a new wading bird, of the genus *Macrorhamphus*, a skin of which Mr. Jerdon sent me, upon loan, to describe some time ago, but of which I had not hitherto published the memorandum I took of it. The following is from the fresh specimen obtained in the Calcutta bazar, and Mr. Jerdon has only procured one individual.

M. semipalmatus, Jerdon. Larger than *M. griseus*, with the three anterior toes connected at base by membranes, of which the inner is equally developed with that connecting the middle and outer toes of *Himantopus candidus* and *H. leucocephalus*, the outer being rather more so. Bill exactly as in *Scolopax*; its terminal fifth smooth and tumid in the living bird, becoming shrunken and papillose soon after death. Length 13 in., of which the bill to forehead measures 2 $\frac{1}{2}$ in.; expanse of wings 21 in.; closed wing 6 $\frac{1}{2}$ in.; tail 2 $\frac{1}{2}$ in.; tarse 1 $\frac{1}{2}$ in.; middle toe and nail 1 $\frac{1}{2}$ in.; hind-toe and nail $\frac{9}{16}$ in. Bill dusky, dull carneous towards the base of the lower mandible; legs and toes lead-coloured. Winter plumage ashy-brown above, with whitish-grey margins to the feathers; crown and lores dusky, the feathers but slightly margined paler; and divided apart by a whitish supercilium: throat, neck, and breast, somewhat indistinctly pencilled with a zigzag subterminal dusky marking on each feather, on a dull white ground; increasing to three or four dusky bars on those of the flanks and on the lower tail-coverts: belly and vent white: rump and upper tail-coverts white, banded with dusky-black: tail-feathers also banded with dusky-black, the dark bars being broader than the white ground: in the uropygials, or middle pair of tail-feathers, the white disappears on the inner web, and is reduced to a series of spots on the outer; the primaries and their coverts, and the winglet, are dusky; the shorter primaries, to a partial extent, and the secondaries and their coverts, being edged with white: the first primary a little exceeds the second in length, and has the usual stout and conspicuously white stem: under-surface of the wing chiefly white, except along its anterior borders.

This bird is probably a sea-side species, like its chiefly American congener; which would account for its being so rarely brought to the Calcutta bazar, among

the heaps of small waders that appear there daily for more than half the year. In like manner *Numenius phaeopus*, and *Strepsilas interpres*, are very rarely brought, and I have never yet obtained there the common *Hematopus* of the shores of the Bay, nor *Calidris arenaria* (which has at least once been procured by Mr. Jerdon). Three other species that I have respectively obtained only once, are *Vanellus (?) leucurus*, *Tringa canutus* (which has once likewise been procured by Mr. Jerdon), and *Phalaropus lobatus*. The last was obtained on the 11th May, 1846; it was exceedingly emaciated, and had not commenced changing colour. The Woodcock I have obtained here twice, and have heard of other instances of its occurrence. During the present cold season, I have procured for the first time *Podiceps cristatus*, L., which I am informed is not rare in the Soonderbuns: * and I have once only procured the beautiful *Anas formosa*, Gm., (v. *glocitans*, &c., nec *bimaculata*). The Mallard (*Anas boschas*) never, nor has it been met with in the peninsula of India, though occurring up the country. The same holds with *Vanellus cristatus*, and one or two other species. In the peninsula of India, Mr. Jerdon has once only procured the Australian *Hiaticula nigrifrons*, which he has described by the name *Charadrius russatus*.† Another Grallatorial bird discovered by Mr. Jerdon, which I may

* The excessively rude fowling-pieces used by the bazar shikarrees are little calculated for hitting such wary and rapid divers as the Crested Grebe.

† Among the land-birds, one or two stragglers, chiefly from the hills, have severally been here met with once: such are *Gecinus striolatus*, nobis, *G. chloropus*, Vieillot, *Cypselus micropus*, nobis, *Tephrodornis grisola*, nobis (a Malayan species), *Monticola cinclorhyncha*, (Vig.), and *Calliope cyana*, (Hodgson). Other chiefly hill species on two or three occasions only; as *Chrysocolaptes sultaneus*, (Hodg.), *Accipiter fringillarius*, *Acc. virgatus* (v. *beera*), *Falco perigrinator*, *F. severus*, *F. subbuteo*, and *Tinnunculus vespertinus*; *Oriolus cochinchinensis*; *Treron nipalensis*, *Tr. chlorogaster* (the S. Indian representative of the common *Tr. phainopeplus* of N. India, now and then met with, as is likewise the white-bellied *Amadina malacca*, similarly representing in S. India the *A. sinensis* of Bengal, &c.); *Brachyurus triostegus* (Sparrman, the *Pitta brachyura* apud Gould,) occasionally; and there are species of the *Phylloscopus* group which I have hitherto procured only once, as *Abroennis cantator*, (Tickell, v. *Abro. schisticeps*, Hodgson, apud G. R. Gray, nec apud nos, XIV, 592), *Phylloscopus indicus*, (Jerdon, v. *Ph. griseolus*, nobis, XVI, 443, as now identified by that gentleman), *Ph. javanicus*, (Horsf., v. *magnirostris*, nobis), and *Ph. nitidus* nobis, twice. And there are several species of birds which I have never yet obtained on the alluvium of the river, but which abound immediately this is quitted, and thence are distributed southward even to Ceylon. Vide my note on this subject, XVI, 117. Also certain mammalia, as *Sciurus tristriatus*, and sundry Muridae.

Since the above was written, I have likewise obtained in Calcutta a fresh specimen of *Caprimulgus macrourus* (*verus*), Horsfield, common in Arracan, Tenasserim, Malacca, Java, and thence to the northern coast of Australia. In Bengal and northern India gener-

take this opportunity to describe, is of a form nearly allied to *Cursorius*, from which it differs chiefly in having a much more robust and shorter bill, and in the first primary being rather shorter than the second and third. The eye, also, would appear to be very much larger and more Plover-like—at least in the Indian species ; but a second representative certainly exists in the *Cursorius chalcopterus*, Tem., of Africa, the eye of which is however represented as being small in the coloured figure published by Messrs. Mitchell and G. R. Gray.

Macrotarsius bitorquatus, Jerdon. Length 9½ or 10 in., of wing 6½ in., and tail 3 in. ; bill to forehead ¼ in., and very nearly ¼ in. in least vertical depth, about the middle ; tarse 2½ in. ; middle toe and nail ¾ in. Colour sandy-brown above, with a faint pink gloss ; the dorsal feathers slightly margined with rusty-brown, and the wing-coverts more conspicuously with pale rufescent : crown of the head black, with rusty lateral margins to the feathers ; a broad white supercilium, commencing with the lores, is continued round the occiput ; and there is a less defined (but equally conspicuous) rufescent-white streak along the mesial line of the head ; ear-coverts streaked dusky and ferruginous : throat white, with a broad rufous band below it ; this is bordered by a narrow white semi-collar, continued to below the ear-coverts, and narrowly edged above and below with dusky ; then follows a broad brown gorget, and finally another white collar, margined above and below with dusky ; this again is succeeded by brown, forming an ill-defined band on the lower part of the breast ; and the rest of the lower-parts are isabelline, with white upper and lower tail-coverts ; primaries and their coverts black, the first two primaries largely and obliquely marked with white, which is reduced to a large subterminal spot on the inner web of the third primary, and a small analogous spot on the fourth : tail white at base, extending for two-thirds of the length of the exterior web of its outermost feather ; the terminal half of the tail black, passing basally into brown, and all but the middle feathers having a small white spot at the extremity of their inner webs. Terminal half of the bill corneous and black, the basal half pale (probably yellow in the fresh bird), and the legs also pale. Inhabits the eastern Ghâts of the peninsula of India.

A natatorial bird that may be redescribed with advantage, is the African representative of the common "Brahminee Goose," or "Ruddy Sheldrake" of authors, (*Casarca rutila*) of India.

Casarca cana, (Gm.) This bird is correctly described by Sonnerat as *l'Oie Sauvage à tête grise de la côte de Coromandel* : being thus mistaken for *C. rutila* of Asia, from which it is very obviously distinct, however closely allied. The male (judging the sex from analogy with that of *C. rutila*) has the head and

ally, this species is replaced by the nearly allied *C. albonotatus*, Tickell : and in S. India and Ceylon by the equally allied *C. mahrattensis*, Sykes.

neck of a drab-brown colour; the lower part of the neck encircled by a ferruginous collar (in place of the black one of the male *C. rutila* when in full plumage); the neck below the collar, and the whole breast, are pale isabelline, abruptly contrasting with the ferruginous of the back and under-parts, which on the back is of a much deeper hue than in *C. rutila*; the abdominal patch is deep ferruginous—approaching to maronne—in both species, but the under tail-coverts are paler in *C. cana*, and the black on either side of them at base of *C. rutila*, is in *C. cana* replaced by dusky minutely freckled with whitish; this freckling is also seen on the inner scapularies and inter-scapularies of *C. cana*, and the tertiaries have their outer webs of a deep maronne colour—the wings being otherwise alike in the two species. Size and proportions also the same. The specimen of *C. cana* described was referred to *C. rutila* in VII, 581; and Mr. G. R. Gray, in his 'Illustrated Genera of Birds,' suggests the name as a synonyme of his *Bernicla inornata*, (King),—a very doubtful *Bernicla*, by the way, and which seems rather to pertain to the *Chcnalopex*, *Casarca*, and *Tudorna* group; while Mr. Gould's *B. jubata*, (Lath.), is as evidently allied to *Nettapus*. The present description will, I trust, establish *Casarca cana* as an undoubted species.

E. BLYTH.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of March, 1848.

Days of the Month.	Maximum Pressure observed at 9h 50m.		Minimum Pressure observed at 4 p. m.		Aspect of the Sky.	Temperature.	Wind.	Rain Gauges.			
	Barometer to 32°	Reahenheit	Barometer to 32°	Reahenheit				Elevation.	Feet	Lower 40	Inch
1	29.771	80.9	81.5	75.2	S. W.	82.8	87.4	78.2	90.7	...	...
2	.807	83.9	83.8	76.6	N. E.	79.1	91.3	70.9	93.8	...	...
3	.896	82.0	83.4	71.0	E. S. E.	74.3	92.0	78.0	94.1	...	...
4	.904	83.0	83.6	76.3	S. W.	75.4	91.2	90.2	93.0	...	...
5	.928	82.0	82.6	74.7	W. N. W.	Ditto.	Ditto.	Ditto.	Ditto.	...	...
5S	.891	83.7	84.5	73.5	S. W.	73.8	92.3	95.6	94.0	...	...
6	.846	83.0	83.6	71.8	W.	Ditto.	Ditto.	Ditto.	Ditto.	...	...
7	.965	80.0	80.0	61.9	E.	73.8	96.0	72.9	94.5	...	...
8	.880	78.2	78.3	60.5	N. W.	Cirro cumuli.	77.9	86.4	66.3	89.4	0.14
9	.916	81.8	81.6	73.8	S.	Clear.	82.8	80.0	87.8	89.6	0.27
10	.962	81.8	81.9	75.5	S. W.	Cumuli.	81.9	88.8	88.8	90.0	...
11	.924	77.0	77.2	73.0	W.	Cloudy.	76.4	85.7	84.8	86.9	...
12S	.916	81.8	81.6	75.5	S. W.	Cumuli.	Ditto.	Ditto.	Ditto.	...	...
13	.962	81.8	81.9	75.5	S. W.	Cloudy.	81.9	91.0	76.7	91.6	...
14	.975	82.0	82.1	76.6	N. W.	Ditto.	81.1	91.4	90.2	92.6	...
15	.931	84.3	84.3	77.8	W.	Clear.	78.9	94.7	94.1	92.3	...
16	.862	84.3	84.4	78.7	N. W.	Cloudy.	72.6	95.9	95.0	96.3	...
17	.867	88.7	88.7	73.8	N. N. W.	Clear.	77.0	97.9	96.5	96.5	...
18	.973	85.4	85.1	64.2	N. W. sp.	Ditto.	Ditto.	Ditto.	Ditto.	...	...
19S	.829	85.8	84.0	77.3	S. W.	Cumuli.	.829	94.3	92.0	90.0	...
20	.916	81.9	82.0	75.0	S. W.	Ditto.	.722	88.5	92.0	78.4	...
21	.866	85.9	85.4	78.0	N. W.	Gloomy (cumuli.)	.705	94.8	93.3	90.0	...
22	.829	85.8	85.0	78.7	W.	Hazy (cirro cumuli.)	.686	96.5	93.6	81.5	...
23	.815	85.9	85.4	78.0	N. W.	Clear.	.767	100.3	99.4	70.5	...
24	.855	87.2	86.9	76.3	S. W.	Cumuli.	.805	98.2	96.0	70.3	...
25	.951	86.0	84.4	77.5	E. N. E.	Ditto.	.766	99.8	98.0	73.4	...
26S	.969	87.2	86.9	76.3	S. V.	Cumuli.	.756	100.9	99.2	70.5	...
27	.933	86.7	87.0	78.8	S. W.	Ditto.	.738	96.0	96.0	86.6	...
28	.918	87.6	86.7	80.2	S. W.	Ditto.	.736	89.5	88.0	81.0	...
29	.875	88.7	88.4	79.5	S. W.	Cumuli.	.736	89.5	88.0	78.0	...
30	.857	86.4	85.2	77.8	S.	Ditto.	.736	89.5	88.0	78.0	...
31	.829	83.8	83.7	75.1	W.	Ditto.	.736	89.5	88.0	78.0	...
Mean	29.899	83.8	83.7	75.1			29.778	94.0	92.6	75.1	0.41

JOURNAL
OF THE
ASIATIC SOCIETY.

APRIL, 1848.

Itinerary from Phari in Thibet, to Lassa, with appended Routes from Darjeeling to Phari.—By A. CAMPBELL, M. D. Superintendent of Darjeeling.

One more contribution to conjectural Geography in the form of an unpretending Itinerary, will not, I hope, incense the votaries of real Geography, and may less or more interest the members of the Society, as an attempt to familiarise them with a neighbouring country which is so little known to us, yet of such importance to be acquainted with. Phari or Pharidzong, is a frontier mart of Eastern Thibet, well known to the people of Sikim and Bootan, and to which there are other routes through the Himalaya proper, or snowy range, from both those countries. It is placed by Hamilton, from Turner, in Latitude 27° 48' N. Longitude 89° 14' E., and Lassa by the same authority in Lat. 29° 30' N. Long. 91° 6' E. Darjeeling is in Lat. 27° N. and Long. 88° 28' E. The itinerary therefore extends over 2½ degrees of Latitude, and two degrees 38 miles of Longitude, according to Hamilton, who however must probably give way to the later authorities of Europe, in the positions assigned to Phari and Lassa. The routes have been compiled with care, to procure the knowledge possessed by the informants. This is always a difficult task when done through interpreters, and when tried with illiterate and not very observant people, is laborious and discouraging. Mr. Hodgson has, by his notes and remarks, greatly elucidated the details of the itinerary, and has kindly allowed me to attach them to it.

The following Thibetan words are here translated for the convenience of the reader :—

Choo or tchoo,.....	River,
La,	Mountain or Range,
Tso,	Lake,
Lahuri or lari ;.....	A mountain Peak ; Chuma Lahuri or lari, the Peak of Chuma ; Larichoo, the river of the Peak.
Goomba or Goompa,..	Monastery,
Gelong,.....	Priest,
Lama,	High Priest,
Anni,.....	Nun,
Deunkang,	Caravansari,
Jong,.....	Fort or residence of a chief,
Samba,	Bridge.

Where elevations are given, they have been calculated by making the informants compare known elevations at Darjeeling with the places described, or rather with their recollection of them.

Route from Phari to Lassa.

1. *Phari to Tangla*.—A short march about 6 miles—direction north by west. Phari is on the west bank of the Machoo river.* The route to Tangla lies in the bed of the Larichoo River, which has its rise in the Chumulari mountain† and falls into the Machoo about two miles from Phari. The highest peak of Chumulari is close to Tangla. Chapa Goomba of Turner's route, is a mile to the east of "Tangla," and is overtopped by the peak of Chumulari. There are 21 Goombas‡ round the base of Chumulari. Chapa is one of them ; pilgrims make the circuit of the mountain visiting all the Goombas, which can be accomplished in five days ; at all the Goombas save one, (Katok Goomba) there are Lamas, some of whom are Bhutanese. The majority are Tibetans. The circuit of Chumulari is reckoned a work of great merit. The Goombas

* Rises at Cholos, flows 10 stages N. E. and then E. to Phari. It is no doubt the Páchú of Klaproth and Painomchu vel Goddada of some of our maps, though the confounding of the two last is a great error.—B. H. H.

† See Turner's Embassy to Tibet, and vol. 12 Asiatic Researches, p. 253—4, for notices of Chumulari, which is estimated to be 28,000 ft. above the level of the sea.

‡ Gúmbá, religious house, Monastery or Convent, Ani Ghembá, Nunnery.—B. H. H.

are snowed up in the winter and are approachable in the summer only. There are images at all of them. No cultivation near them.

2. *Tenna*.—Rather a short journey, about 10 miles. The route nearly level, and the country cultivated and well peopled. Wheat ripens at Tenna, and turnips, cabbages and other vegetables are abundant.

3. *Goroogootang*.—About 8 miles in the direction of north by east. The road lies over a level country which is well cultivated with wheat and barley. There is a pottery here, and a Dâk Chowkey, also houses for the shelter of travellers; one for Lamas and respectable people, another for the poor. At the latter you pay about 2 annas—a Kakum, or 4th part of the silver Mohur, not a coin of this value, but literally the quarter of a Mohur. Traders alone pay; pilgrims and priests do not.

4. *Dochen*.*—About 8 miles North by East. The road level and the country cultivated. There is a large lake here called “Dochencho”;† its length is N. and South about two miles; its greatest diameter a mile and half. It contains many kinds of fish, and the “Peu” (a native Carbonate of Soda, I believe) is found on its banks. In the summer season the banks of the lake are overgrown with a long grass 4 feet high, called Choomik. In winter they are bare. The “Changmo” or weeping-willow grows close to the water all round the lake. No wooden boats on the lake, but the fishermen use boats made of hides stretched over a basket-like framework, and sown together with leather whangs, the seams being rubbed over with beeswax. These boats carry 4 or 5 men, and are so light that one man carries them easily. The fish are caught in nets. Hooks and bait not used. The fish is preserved by simple drying in the sun, and exported to Phari and to “Menchona,” a populous district to the northwards.

5. *Kala Puktang*.—12 to 15 miles in a north and easterly direction. Here there is a lake of the same name. Its size is equal to that of the Dochen one: but it is celebrated on account of the great quantity of fish it contains. The country around this lake is barren; but it is more populous than around Dochen. The people live by the fisheries, which are very productive, and yield an annual revenue, which

* Dochia of Klaproth.—B. H. H.

† “Choo” is water in Tibetan. “Tso” is Lake; this may be the water or Lake of Dochen.

is paid at Digarchi (Shigatzzi Zeung) amount not known. The road between the two lakes runs over a level country. The cultivators irrigate their lands from both these lakes. "Chumulari" is seen from Kala Puktang to the south and west.

6. *Semodah.**—The "Sumdta" of Turner's route, one day's journey about 15 miles, in the direction of north by east. The road runs over a rocky, barren, and unpeopled tract ; nor is there any halting-place on the way. It is a small village inhabited by Tibetans and has a Dák Chowkey, or Post Station. There is a road from Semodah to Lassa direct ; but it is a difficult and bad one, used only for expresses and by a few travellers ; food is scarce on it ; but the distance to Lassa is much less than by "Giangtchi" and "Yamda Yeumtso."

7. *Kamachooding.*—One day's journey due north, over a rather level country, well cultivated and peopled. There is a large Goomba here, as large as that of Swoyambhúnath in the valley of Nepal ; it is called Kama Goomba ; has about 80 Lamas attached to it and a large library. The Kamachoo, a small stream from the east, runs close to the Goomba. The cultivation of wheat on the banks of the stream is of a superior kind, and vegetables are abundant, such as turnips, radishes and cabbages.

8. *Chaloo.*†—One day's journey to the north, over a rather level country, which is however very rocky and barren. To the east of the road the mountains are close, and their tops are snow-clad in winter. To the west of the road the mountains are also near but not lofty.

9. *Saloo.*‡—One day's journey to the north. There is a Goomba here of the same name, with about 60 Lamas attached to it. This and Kama Goomba are dependencies of Digarchi. The country around Saloo is well cultivated and peopled.

10. *Kideepoo.*—One day's journey due north ; a very bad road over a rocky tract without any ascent to speak of. The country around is partially cultivated ; but there are immense flocks of sheep and goats, the pasture being abundant and fine. In the winter the herds are kept around Kideepoo, in the summer they are taken to the neighbouring mountains. This place is the residence of a Soubah.

* Soumdta of Klaproth.—B. H. H.

† Chahú of Klaproth, who places Chalú south of Semodah.—B. H. H.

‡ Sadú ? of Kl. but he places it a stage beyond Giangtchi.—B. H. H.

11. *Demorang Zeung or Fort of Demorang*.—One day's journey to the north over a rocky country. About a mile to the north of the halting-place, there are 3 hot springs which are in repute for the cure of all diseases. No village here.

12. *Giangtchi.**—About 6 miles to the north. A small town and the neighbourhood well inhabited and cultivated. There is a Chinese officer stationed here with 3 or 400 soldiers, a few of whom are Mantchoo Tartars of the Chinese army. The rest are native Tibetans. A river runs by the town. It rises in the Yeung mountains which are to the north and east. It has no specific name. It is called Changchoo or Changtcheu. All large rivers in Tibet are called “Changchoo.†” Giantche is one day's journey from Digarchi, for an unloaded man say 20 miles, and here the road to Lassa goes off from that to Digarchi to the eastward. The first halting-place on the road to Lassa is

13. *Saoo*.—One day's journey to the east with a little southing, over an undulating country generally, cultivated and well peopled. There are many villages along the road: and the fields are irrigated from numerous small streams which run from the diminutive hills around; the greater number of which have a Goomba or monastery on the summit. The streamlets about Saoo run into the “Changchoo,” the course of which is north and west. Snow does not fall at Saoo: but it does on the line of road where it crosses the Yeung mountain for 3 or 4 months in the year i. e. November to February.

14. *Yeungla or Mount Yeung*.—One day's journey to the east by south, along a stony road which ascends all the way by zigzags to the resting-place, which is in a saddle on the crest of the mountain. The ridge to the north from the resting-place is higher than to the south,

* Dzialdge of Kl. This place is famous for a particular breed of ponies, (see Sp. Rev.) and is one of the more considerable of the very petty towns of Tibet.—B. H. H.

† Changchoo—river of Cháng, softened from Tsáng, which is the name of the western half of the central province of Tibet, called U'tséng, U being the Lassa division, and Tsáng the Digarchi one. The great river of Tibet is called the river of Tsáng or Tsáng, *vide* Sanpú-Dzangbo of Klaproth. Its pre-eminence leads to all rivers, especially those of Tsáng, being called in a like manner, just as in India any large river is Ganga. Yaru is the distinctive name of the great river whose full title is Yaru tsáng pochú, great river Yaru of tsáng. Klaproth's Changchoo however, lies far off the route on the left hand.

and is estimated to be 2,000 feet above it. There is a Caravansari for travellers. Snow falls here in winter, but not enough to close the road. There is no cultivation or population at the Yeungla saddle. The zigzag road was made by the Government and is a good one for ponies.

15. *Rongting River*.—An easy day's journey by a descent all the way along a zigzag road as on the west side of the mountain. The country on the route is uninhabited and uncultivated. There is a Caravansari or Deunkang for travellers on the bank of the river, which has a stone bridge at the crossing. The "Deunkang" is a large stone building with a slated roof and has many apartments. Travellers of rank occupy separate rooms. The poorer ones assemble together. The Rongting runs to the westward by north.

16. *Dabloong*.—One day's journey along the banks and in the bed of the Rongting which is crossed five times during the march. At each crossing there is a stone bridge; the direction of the route is easterly and against the course of the river. There are a few villages on the river side and occasional patches of wheat and barley cultivation. Dabloong is a poor village of 10 houses, and on the east bank of the Rongting. No firewood at this stage. Travellers cook with sheep and goat dung.

17. *Karoola*.*—Leaving the Rongting at Dabloong the road ascends all the way to Karoola over a barren and bare country. There is a "Deunkang" for travellers. It snows much here and is very uncomfortable. The traveller who cooks at this stage must bring the fuel (sheep's-dung) from Dabloong. The mountains to the north of Karoola are covered with perpetual snow, and are very lofty. To the south the mountains are much lower, and have no snow on them; supplies of grain are not procurable on this route after leaving Giangtchi, until you get to Kambala, in all 14 marches. Travellers must take grain with them.

18. *Zhara*.—One day's journey east by south. The descent is considerable on this stage, and the road runs along a spur of Karoola to Zhara, which is on an undulating plain or table-land. No cultivation along this stage. The Deunkang at Zhara is provided with servants

* Kárú-lá, mount Kárú. So Yeung-lá, mount Yung. Kárú, probably the Khareb (misprint?) of Klaproth, who however gives it a meridional course parallel to and not crossing the route.—B. H. H.

who supply food, and who cook for travellers. These men are Chinese, and are appointed by the Ampas or Chinese councillors at Lassa. The traveller who can pay may have tea, spirits, flesh and eggs. "The charges are so high that Tibetans cannot afford to pay them, and the Chinese only can avail themselves of this accommodation; just as at the Dák Bungalows in India, where the charges are too high for the Natives."

19. *Chakloong* (*the place of thieves.*)—Chakpo is Tibetan for Dacoit. This is a notorious haunt of robbers.* It is their practice to conceal themselves in burrows under ground and watch for travellers, on whom they suddenly pounce. Murders are not commonly committed by gang robbers in Thibet unless the resistance is so great that it cannot be overcome otherwise. The direction of the route from Zhara is east by south, the distance one day's journey; the country level, but rocky, barren and unpeopled; the road, which is easy for ponies and loaded people, runs parallel to a river which rises in the Yeung mountain and runs to the south. There is no house here for the shelter of travellers, but there are numerous and spacious caves in which they rest. Some of the caves are large enough to contain 40 men comfortably. They are not natural caves, but have been cut out of the hill side which is of hard soil.

20. *Nagarchi Jong.*†—One day's journey to the east, over a level country, which is well cultivated and peopled; road good. This is the residence of a "Deboo" or Governor. His district is Nagarchi, which is a large one, extending more than 30 miles to the eastward of his residence. The whole country to "Yamdo Yeumtso," (Yarbragh Yeumtso of Pemberton's map) is level, well peopled, and cultivated.

21. *Yamdo*, (*Yeumtso.*)‡—A long march in an easterly direction over a finely cultivated country. There is a lake here of the same name, on the margin of which is the resting-place. The lake is seen from Nagarchijong, and is close to it some way to the south of the road. The lake of Yamdo Yeumtso is of immense circumference; "Garboo

* M. Huc in his narrative speaks much of the robbers of Tibet, who, he says, are Kalos or black-tent nomadic Tibetans, erroneously styled Kalmaks. They are mounted gang robbers. See British Journal of the Propaganda.—B. H. H.

† Nagardzong of Pemberton's map; Nagar Oze of Klaproth, whose 13th stage it is.—B. H. H.

‡ Palté of our maps; Yarbok Yú and Yambra Yúm of Kl.—B. H. H.

ong," a Raja of Lassa, once travelled round it in 18 successive days and nights. He had relays of Ponies all the way. The country all around the lake is well cultivated and peopled ; and fish are most abundant in all parts of it. The depth of the water is very great. At one place it is 18 score of fathom, 2160 feet. There is an island in the southwest corner of the lake, on which there is a Goomba named "Dorje Phamo." The passage is fordable and about a mile in width. This is the only part of the lake that admits of a fordable passage to the island. In all other parts leather boats are used in the navigation and fishing. The island is a mile in diameter and rises gradually from the water to a height of 200 feet. On the summit is the Goomba which is visited by immense numbers of people from all parts of Tibet. There is an avatar Lama always in this Goomba, which is one of great sanctity and note. It is built of stone and very large. The images are all gilded. The Gelongs* belonging to the establishment are about 100 in number, and there are as many Nuns (Annees.) The library is a very extensive one and the lands appertaining to the monastery comprise the whole of the villages on the mainland to the west. The number and value not known. "The island is not at all large, nor is it the least like that in your map.† A man starting at daylight can walk round it by noon." This is the information of a Lama who has twice circumambulated the island on his visits to the Goomba. All the pilgrims and religionists who visit "Dorje Phamo" circumambulate the island three times ; once along the water's edge, once half way up the hill and once round the summit. On each circuit, at the four cardinal points, is a Chasting (Chaitya) in which are images of stone. The dead bodies of Lamas and Gelongs belonging to the Goomba are carried to the shore at the different Chaityas. A fire is lighted as a signal to the vultures ; a blast is blown from the thigh-bone of a man for the same purpose : and the body being cut into small pieces and the bones broken, the whole is scattered about to be devoured, which is done very quickly by swarms of kites and vultures. The bodies of the poor are thrown on the shore entire to be torn asunder at leisure : and after the flesh has been removed the skeletons are thrown into the lake.

* Gelung is Monk ; Lama, he who shows the way ; lam, learned monk ; often Prior or Abbot.—B. H. H.

† Pemberton's.

There is a spring of sweet water on the Island, which supplies the Goomba, and on the mainland the people drink the water of other springs. The water of the lake is not reckoned wholesome. Running water is always preferred in Tibet. Horses and cattle swell up after drinking in the lakes, and sometimes suffer greatly from doing so.

22. *Yassi*.—One day's journey in a northerly direction along the banks of the lake. The road is good and passes through level fields and small villages all the way. There is a Post Station here, and nothing more.

23. *Kesong, (Sambo)*—*The bridge of Kesong*.—One day's journey in an easterly direction and along the lake's side. The bridge of Kesong, built of stone, is over a creek of the "Yamdo Yeumtso," which extends in a northerly direction about two days' journey. It is not running water. At the bridge it is 400 yards wide. The Yamdo Yeumtso is fed by numerous small rills, but has no river running out of it. The bridge of Kesong is sometimes under water in the rainy season (August). It is formed of 18 stone-masonry pillars with a platform of large slabs or slates. The depth of water at the bridge in the dry season is but 2 or 3 feet.

24. *Phedijong*.*—One day's journey to the eastward along the lake. This is a station for a detachment of about 60 soldiers, Chinese and Tibetans, and the residence of a civil officer, styled the Phedijongpun. There is a good sized village and provisions are procurable. Wheat and barley are the principal articles grown in the neighbourhood. The country is level and productive. The plough with bullocks is used by a few of the better sort of people; but the hoe (kodali,) is most in use. The cattle hereabouts are of a short horned kind, black, red and spotted. They are famous as milkers. Flocks of sheep and goats are numerous and extensive. The Kiang (wild ass) is not known here; it is most abundant about Chumulari and Phari.

25. *Tamaloong*.†—One day's journey east by south; about half way

* Zung or Zeung, is fort, military post. Such and monasteries (Gúmbá) constitute the nuclei of nearly all the small towns or villages of Tibet; Zung-pun is chatelain, or Killadar.—B. H. H.

† (Djamaloung of Pemberton's map.) Djamaloung of Klaproth, who however places it on the Sánpu, far north of the Yamdo Yeum and having the Gamba or Kambo range interposed. Kl.'s route crosses the Sánpu here.—B. H. H.

between Phedijong and this place the road leaves the bank of "Yamdo Yeumtso" and the country rises, but is cultivated and well peopled. The ascent is gradual, however, and the road good. The village at this stage contains about 20 houses.

26. *Kambaparzy*.—A very long march. The road lies over a pass of the Kambo mountain, the whole of which to the north of the road is covered with perpetual snow. To the south also of the pass is generally covered with snow, and in winter the pass itself is sometimes snowed on, but is never blocked up. The district of Digarchi extends eastwards to the Kambo mountain; and the Lassa district extends westwards to the same range. The Kambola* range extends southwards to the Yamdo Yeum lake and a great way to the north. The halting-place is at the foot of, and on the east side of the Kambo mountain. The ascent on the west side, and the descent on the east, are about the same in extent: Tamaloong and Kambaparzy being about the same level. At the latter place there is a good deal of cultivation, wheat, barley, and buckwheat (*jáoo*) are grown here. Buckwheat is not met with anywhere on the road from Phari, until you come to Kambaparzy, so that this is the lowest elevation on the road. It is warmer here than at Tamaloong. [N. B. The descent to Kambaparzy must be greater than the ascent from Tamaloong, as the temperature is considerably higher at the former station than at the latter. So say my informants.]

27. *Kumpachangtong*.—One day's journey due east, over a level country which is cultivated and peopled. There is some descent in the course of this march, and the temperature is warmer as you go along. Wheat, barley, and buckwheat are the staple crops. The plough is used in agriculture as well as the hoe; beans, turnips and radishes are the only vegetables grown.† [N. B. According to Pemberton's map the great river of Tibet, the Sampo, should have been met with on this march as on the preceding one.]

28. *Chasumchoori*.—One day's journey to the east. At this place

* La, mountain. Kambo is the Gamba of Klaproth and Cambala of Rennell.—B. H. H.

† Moorcroft gives an excellent account of the 5 species of barley proper to Tibet, and which are eminently deserving of the attention of agriculturists. The turnips also are excellent.—B. H. H.

you cross the Yaroo Tzangbo,* (Sanpoo) which is the largest river in Tibet. It runs here to the eastward, but its course previously is from the north, for it comes southwards along the east side of the Kambo range. The Yaroo Tzangbo does not run near Digarchi, it is to the north of that place. How can it run in an easterly course all the way from Digarchi when the great Kambo range runs north and south? The Yaroo Tzangbo comes a long way down from the north to the east side of the Kambo range. At Chasumchoori the Yaroo Tzangbo is three times the size of the Teestah river where it is crossed on the road from Darjeeling to Tumloong, the Sikim Raja's residence. There is an iron chain suspension bridge over the Yaroo at this place. It is only wide enough for one man to go along. The platform is a single plank a foot wide. Loaded men, cattle, horses and merchandise are crossed in wooden boats. The iron bridge was erected by the Lamas of Chasumchoori Goomba ages ago. The piers are of stone masonry, the chains are formed of strong links each a cubit long. The bridge does not span the whole river. The pier on the northern side is some distance from that bank, so that in the dry season even after crossing the bridge you have to wade some way to the shore. In the wet season you cannot ford the space between the northern pier and the bank, and are therefore obliged to cross by boat. The bridge is 20 cubit at least above the river, which is a rapid one and never fordable. The Goomba here is a large one; it has 200 Lamas and Gelongs belonging to it, and a very large library.

* *Yarú tsang-po.* See preceding note.

Yaru is the proper name. Tsang-po, an epithet pointing out its intimate connexion with the great central province of the country or Tsáng.

De Coros, from Tibetan authorities, notices the several great ranges that traverse Tibet. He gives 6 such, and says Lassa and Digarchi lie in a valley between the 3d and 4th. But he implies that all these ranges run parallel to the Himalaya, whereas the Kambo range is here clearly made to be a transverse or meridional chain, and M. Huc notices no less than 4 such as occurring between Siling and Lassa, viz. Chúgá, Bayam Khár, Tanla and Koiram, the winter passage of all which he describes in fearful terms. The Bayam Khár, says Klaproth, divides Siling from Kham, and the valley of the Hohangho from that of the Yangtse Kiang. The Kambo of this itinerary is the Gamba of Klaproth, who is followed by Ritter in making the range and the river run parallel to each other west to east, with a little northing, all the way from Digarchi to Jamaleing, where the river is crossed and the road strikes north up the Galdze to Lassa. Digarchi is placed on or close to the river by Klaproth (*Mémoires* 3, 416, map) and by Ritter (*Atlas of Mahlmann, No. II, Ost Hoch Asien.*)—B. H. H.

29. *Choosoojung.**—One day's journey along the north bank of the Yaroo in a south-easterly direction. There is a Deboo or Governor resident here, and a Military Detachment of about 100 men, Chinese and Tibetans. They are armed with muskets, swords, bows and arrows. They have no artillery. They are not uniformly dressed. The Chinese wearing their national costumes, and Tibetans theirs. The country around is level, but the "Jong" or Deboo's house is on a hill. The Governor is a Tibetan. The climate is temperate here, as it always is near the rivers. When the sky is cloudless in the summer season it is hot : but the people wear woollens all the year round.

30. *Chisoom*.—One day's journey in a north-easterly direction, over a level country. This is the residence of a Deboo or Governor.

31. *Parchie*.—One day's journey in a south-easterly direction, over a good road and through a level well cultivated country. This is a Post Station, and the village is on elevated ground.

32. *Num.†*—One day's journey due east, over a level country. Road good, the country well peopled. It does not snow here even in winter, and the climate is agreeable, not cold, nor hot. This is a Post Station, not for the conveyance of mails, but where relays of Ponies are placed for travellers of consequence.

33. *Lang-dong*.—Due east from Num one day's journey over a good road. The country is well peopled, but there is no village at the resting-place.

34. *Jangh*.—A day's journey in an easterly direction. The country level, well cultivated and peopled. A small village and Post Station here.

35. *Nithang.‡*—This place is in the middle of an immense plain on which there is no cultivation or population. It is nearly bare, has no water and is very hot. People cannot live on the Nithang plain, which is a sort of desert on account of the heat and drought. The soil is sandy in many places. The Goa Antelope is the only animal found on Nithang. The plain is about 20 miles across.

* (Taisnchoudjoung of Pemberton's map.)

† Nam occurs in Kl. as the name of a ridge or Peak off the route and about a degree W. S. W. of Lassa.—B. H. H.

‡ Kl. notes a river Nitang a feeder of the Galdzo which runs east from mount Nam. Rennell has a stage so called.—B. H. H.

36. *Kechoo*.—The resting-place is on the river of this name, which runs from the east and by the town of Lassa. Its course from Kechoo is to the south. It is a large river never fordable. It is crossed in leather boats. The banks of the river are fertile, well cultivated and peopled. The houses are all built of stone.

37. *Chambarangjeung*.—One day's journey to the north from the Kechoo river. There is a good deal of ascent on this march and the road is rough and stony. "Chambarangjeung" is the name of a large stone image which stands on a hill near the resting-place, and to which there is a considerable resort of pilgrims and worshippers. The history of the image is not known. It is believed to be of immense antiquity. It is in the figure of a man cut in bas relief on the rock. Its height is reckoned at 30 feet and it is well proportioned. There are no inscriptions on the rocks about it. The right hand hangs on the thigh. The left is across the breast, and grasps a round stone, the size of a six pound shot.

38. *Tcheuling*.—One day's journey north by east over a level country. No descent from Chambarangjeung, and it is a nearly level plain all the way to Lassa. There is a Goomba here of the same name, the Lamas of which are of the *Geloo** order, i. e. they wear the yellow robe and sugar-loaf cap. The number, with the Gelongs, is about 100. The country around is well peopled. It appears that from Chambarangjeung to Lassa the country is an elevated plateau, and that the Kechoo river runs along its southern face. The elevation is estimated at about 200 feet.

39. *Teloong*.—On the left bank of the river Zsheunemoongtcho, which runs from the north and keeps a southerly course from "Teloong." It is crossed by a stone bridge. The country on both banks is level, well peopled and cultivated.

40. *Shemidonka*.—This is a small town inhabited entirely by Chinese, i. e. the males are Chinese, the women are all natives of Tibet. The Chinamen who serve at Lassa are not allowed to bring their wives along with them; they marry Tibetans, and on their return to China leave them and their families behind. The men of this town are principally soldiers, and other followers of the Chinese Ampas, resident Councillors, at Lassa. The distance from Lassa is about 30 miles.

* Géluk-pá, the most modern, but dominant sect of Lamaism.—B. H. H.

41. *Debong Goomba, or Convent of Débung.*—About 15 miles in a northerly and easterly direction. The road all the way is paved with stone flags and is broad and level. The country around is fertile and well cultivated. The grand Lama of Lassa, Gemooramoochi, frequently resides at Debong Goomba, which is a very large one and has extensive endowments of land.* The Lama has five principal Goombas immediately subject to his control and near to Lassa. His chief residence is in Lassa, at Patala Goomba. To the east of the city is "Sera Goomba," one day's journey. To the west is "Debong Goomba," a similar distance. To the south is "Mol Goomba," and to the north is the "Gandeng Goomba." The road at Debong Goomba takes a southerly direction along the Kechoo river to Lassa. The Kechoo is not crossed before reaching Lassa, it runs to the east of the city about half a mile. Patala Goomba is built on a rock.

42. *Lassa.*—15 miles from Deboong; a paved road all the way. The capital of Tibet and centre of Tibetan commerce and learning.

Remarks by Mr. Hodgson.

I have carefully compared Dr. Campbell's Itinerary from Phari to Lassa, with Klaproth (*Mémoires relatifs à l'Asie* iii. 370—417) and Ritter (*Atlas von Asien* of Mahlmann). Klaproth, followed by Ritter, places Phari in 28 N. Lat. and Lassa in 30 $\frac{1}{2}$ N. Lat. His longitude of the former place is 87—of the latter, 89 $\frac{3}{4}$; so that we have 2 $\frac{3}{4}$ degrees of northing and the same of easting, and cannot allow above 400 miles for the whole distance, even if we give 100 for the road increase, and that is too much allowance on that head. Klaproth's main data are so well founded (*Mem. ubi supra*, p. 371) as to command a necessary assent: wherefore Dr. Campbell's total of 515 miles is clearly too much by above 100 miles. On routes like this, where there are few inhabited places to halt at, lazy folks like Lamas, make innumerable stages, guided by indolence and by convenience of wood and water,—both very rare in Tibet. Klaproth has but 21 stages—Dr. Campbell, 42. Klaproth's stages, as far as given, are as follows:—

- | | |
|-----------------------|---|
| 1. Chasa, | Chumalari occurs between 2-3 stages, much north of Chasa; and under the peak is the lake of Ram or Züm; route is due north all the way. |
| 2. Gangnam, | |
| 3. Dochia, | |

* Well described in Huc's narrative.—B. H. H.

4. Chalú, } Course N. E. Another lake called Gangla is
 5. Súmdta, } passed.

6. Gangamor, } Course due N. up the Bainam river (Painom-
 7. Cháhú, } chú.) A meridional ridge on either hand.
 8. Nami, } That on the left called Chún. At Dzíaldze the
 9. Dzíaldze, } roads to Digarchi and to Lassa diverge. That
 } to former down the Bainam, which falls into the
 } Sanpu at Digarchi itself.

10. Sádú, } Course a little east of north up the Nian
 11. } river, a feeder of the Bainam, which having
 12. } flowed S. W. as far as Dzíaldze, turns N. W.
 } led by the main stream. The Lalúng and
 } Zúng are crossed; and oblique meridional
 } ridges bound the road, which are styled Dad-
 } rang, and Kharab and Kiábzú. Those on the
 } left hand blend with the Gamba range.

13. Nagardzé, } Route lies to the N. E. chiefly along the
 14. Chaidam, } Gamba range. The Sánpu is crossed between
 15. Jamálíng, } 15-16 stages. The great lake called Yambra
 16. Chúchúr, } Yúm and Yár brok Yú, is left far on the right.

17. Raya dúmba, ... } Course nearly north along the right bank of
 18. Nitang, } the Galdze, several feeders of which are crossed;
 19. Túrung Gang, .. } one is called Nitang, which name occurs not as
 20. Dúnggár, } that of a town. The Ram ridge remote on the
 } left hand. No town of that name occurs. The
 } ridge is obliquely meridional.

21. Lassa, } Course S. E. parallel to the river, which
 } makes a deep curving bend, embracing Lassa on
 } the south.

N. B.—A few stages may be omitted. Halts in the desert.

Ranges.

Dr. Campbell's 2d ridge is probably the Chún of Klaproth, who however gives it a meridional course parallel to the river Bainam and not crossed by the route. Dr. Campbell's Kárú ridge may be the Kharab of Klaproth, and his name, a misprint for Khárú-lá or mount Khárú. Dr. Campbell's Kambo range is unquestionless the Gamba of Klaproth. The route crosses it according to both. But Klaproth makes it ruu E.

and W. (from Jagagunggar to Digarchi) only treading a little to the north; and he makes the Sánpú hold a parallel course, excepting the sinuosities of the river. Digarchi is placed by Klaproth on the right and south bank, and the river runs north of the town in an even eastern direction. There is another range, according to Klaproth, north of the river, which also is more or less parallel to its course. The Peaks of this northern range are called Súng Súng, Bukori, Nam, &c. The Kambo or Gamba range does not run southwards nor terminate at the great lake, nor can it be the boundary of the U' and Tsáng provinces. A continuation of it, however, running from Jamálung to the lake is meridional or follows a south direction, and seems to end at the lake, though Klaproth carries it much further south, viz. to Dód, under the name of Ganglagangri. This portion of the range may mark the boundary of the two great provinces. But the route, according to Klaproth, leaves it far on the right and crosses it where it has a W. and E. course parallel to the great river.

Towns.

Dr. Campbell's Giangtche is the Dzialdze of Klaproth, and both place it at the bifurcation of the Digarchi and Lassa roads. But it is Dr. Campbell's 12th and Klaproth's 9th stage. The other chief places on or near the route, in Klaproth, are Nagardze, on, Runbung, off, Báidi, off, Chúchar, on, and Dunggar, on, the way. Of these the first is Dr. Campbell's Nagarchi: the rest occur not in his Itinerary. I have noted, at the foot of each page, as a note, the coincidences all along where such occur between Klaproth and Dr. Campbell.

Rivers.

West considerably of the route and of Phari, Klaproth has several streams, viz. Nio, Píng, Ghi, Lá, and Gó, all of which unite to form the Tchangtchú or river Tcháng. This is the Changchoo of the Itinerary, quoad name, but not quoad position. And the Pá of Klaproth is probably the Má of the Itinerary, though there again the position of the stream cannot be reconciled. I have remarked as a note, on the name Chángchú, and also observed on the vague cluster of feeders arrayed by Klaproth, all which seem identifiable with the Má, whose remotest sources are under the great peak of Cholo, whence the Itinerary gives it 10 stages through Thibet to Phari. Klaproth makes Chumalári, not Himáchal, the great water shed of this part of Thibet: so also Turner.

The snowy range is here, no doubt, broken with inner and outer ridges, whereof Chumalári is (for us) the inner and apparently the most elevate, though Cholo is also of vast elevation. From Chumalári the rivers of the route flow south to India and north to the Sánpú. Klaproth's Bainomtchú is the Painomechú of our maps, which however sometimes confound it with the Pá or Gaddada of Rangpúr, whereas the Bainomchú runs due north to Giangchi and N. W. thence unto the Sanpú at Digarchi.

The Lá Lúng, Júng and Nian or Nan, which occur in the route, according to Klaproth, between Giangchi and Nagarchi, are not identifiable with any thing noted in the Itinerary, which however exhibits several small streams in similar positions.—B. H. HODGSON.

APPENDIX No. 1.

Darjeeling to Sikim Durbar.

Places.	Miles.	Remarks.
Badamtam,	4	The road runs along the ridge of Leebong to Ging, thence descends an offset or small spur of Leebong.
Rungeet River, ..	5	A steep descent all the way ; Pine trees on the roadside about $\frac{1}{2}$ way down ; cross the Rungno river $\frac{1}{2}$ a mile this side of the ferry over the Rungeet.
Namgialatchi,	6	The Rungeet, about 150 feet wide in the dry season and ten to fifteen feet deep, is confined here within a rocky bank on the east side. In the rains its bed is probably 400 feet.
Temi,		One day's journey for a man with a light load.
Rumphoke,		Ditto ditto ditto.
Shamphoo Ghat ..		On the Teestah river. The road from Rumphoke is described as very rocky and the descent into the bed of the river almost precipitous.
Ryote River,		An easy march of ascent the greater part of the way.
Toomloong,		Residence of the Raja ; an easy march.

To the Sikim Durbar from the plains by the Mahanuddi river.

Kooijhora, Reng, Rungula, Renick, Namgialachi, and thence as above.

N. B. The distances given are not correct, merely estimated ones.

APPENDIX No. 2.

Route from Toomloong, the Residence of the Sikim Raja, to Phari in Thibet.

No.	Stages:	Remarks.
1	Tumloong to Kabi, day's journey, say 18 miles,	The Dikchoo river is crossed by a Sangā about 6 miles from Tumloong.
2	Lā Ghēp,	Through mountains all the way, which are tipped with snow.
3	Chálápok,	Ditto ditto; snow on the mountains along this march.
4	Chala,	The top of the pass into Thibet; snow here at all seasons except in the height of the rains.
5	Tángzóō,	From Chola you begin to descend, and the road runs north descending almost all the way. Perpetual snow to the right and left.
6	E-tok,	A gradual descent all the way in the bed of and along the Tangzóó Nuddi. The Táng- zóō rises close under Chola.
7	Choomba.	On the Machoo river, which is here as large as the little Rungeet, and has a wooden bridge over it. The Machoo runs north and east.
8	Eusa,	Along the Machoo all the way.
9	Bukcha,	A considerable town on the Machoo. Houses on both sides connected by a bridge of stone- piers with wooden platform. The Sikim Raja lives here during the rains of every year and holds a Jageer in the neighbourhood from the Tibetan Government at Lassa.
10	To-yeu,	Also on the Machoo river.
11	Galling,	From Toyen to this place the road is over steep mountains, but in the direction of the course of the Machoo.
12	Gango,	A town on the Machoo. Houses of stone. A bridge of stone piers with wooden platform.
13	Sezeung,	A village on the Machoo. There are nu- merous villages along the river on this march.
14	Phari,	A town and district so named. The town is about two miles from the Machoo. It con- tains shops and traders, and the 4 Soubahs of the district reside in it. There are a few Tibe- tan soldiers quartered here.

The principal town in the neighbourhood of Khari is Rinchingong, a
large mart, two marches east of Choombi. It belongs to Tibet. Here

the people of Bootan, Sikim and Tibet meet to trade. It is to the north of the snowy range. Pema is the first march from Choombi towards Rinchingong. At Pema there is a monastery of many Lamas and a library.

APPENDIX No. 3.

Divisions of the Route.

No.		Marches.	Miles.
1	Darjeeling to Tumloong, the residence of the Sikim Raja.	8	60
2	Tumloong to "Choombi," the Sikim Raja's summer residence in Thibet.	7	84
3	Choombi to "Phari," a frontier mart frequented by Sikimites, Bootanese, Nipalese and Tibetans.	7	84
4	Phari to "Giangtchi," where the Digarchi and Lassa roads separate, the latter going to the eastward.	12	129
5	Giangtchi to the lake of Yamdo Yeum.	9	112
6	Yamdo Yeumtso to Yaroo Tzangboo (Sampoo River).	7	84
7	Yaroo Tzangboo to Lassa.	14	190
		64	743

Great Mountain Ranges crossed on the Route.

1st.—The Himalaya proper or great snowy range, visible from Darjeeling, crossed at "Chola," the 11th march from Darjeeling and 4th from Tumloong.

2nd.—The "Yeung range," which is crossed on the 14th march from Phari.

3rd.—The "Karoo range" covered with perpetual snow to the north of the pass, and said to be very lofty, is crossed on the 3d march from Yeungla.

4th.—The "Kamba range," covered with perpetual snow and described as the most lofty in Tibet, is crossed on the 8th march from "Ka-

roola." This range divides the "Digarchi" and "Lassa" jurisdictions. The Kambo range runs southwards, terminating at the great lake of Yamdo Yeum. It is not given in Pemberton's map, but in Mr. Hodgson's route from Nipal to "Tazedo," on the Chinese frontier. (As. Res. Vol. 17, p. 527.) The Kambha mountain is crossed at the 29th stage to "Kambha." This halting-place is doubtless the same as "Kambaparzy" of my Itinerary, although in the latter it is 17 marches from Lassa: and by Mr. Hodgson's only seven. This discrepancy appears to arise in some degree from my route taking a northerly direction from "Kedhoo," which is the next stage to Nithang. But the whole difference I am not able to account for. For instance, by Mr. Hodgson's route, "Nam" is only $14\frac{1}{2}$ cos from Lassa. By mine the distance is reckoned at 40 cos. With regard to the estimated number of miles as taken from the number of stages or journeys, I do not lay any stress on the correctness of my calculation. The journeys have been taken at an average of 12 miles each: but there is no good reason, or any rule in Himalaya travelling to warrant this assumption as a general result, although I think that when the necessities of food, wood, and water do not interfere, 12 miles is about the distance that baggage-carriers can travel over mountain-paths in a day.

At the rate of 12 miles for each stage of this itinerary the road distance from Phari to Lassa would be 504 miles. Estimating each stage at $\frac{1}{2}$ less, or 8 miles, we should have 369 miles only. I am not prepared however to decide in favor of either of these results. My informants have been Lamas who have travelled the road in their vocation; I do not doubt that they have halted as often as noted in the route, but it is impossible to arrive at a correct estimate of distances from that fact; nor is it attempted to do so.

C. CAMPBELL.

Darjeeling, March 22d, 1848.

On the manufacture of the Matchlock of Koteli.—By Capt. JAMES ABBOTT.

Finding my camp near the fabric of fire arms of Koteli in the Punjab, I paid a visit to the fabric, which occupies two villages, about half a mile apart, and situate about 5 miles N. West of Sialkot.

Having witnessed the process of forging a Damask rifled barrel at Heraut, I did not anticipate any novelty on the present occasion. Moorcroft has most accurately described the same process in Cashmere ; but as he gives no figures in illustration, his account may not be perfectly intelligible to persons who are not familiar with the ordinary process.

The iron employed at Koteli is chiefly of the produce of Mundi, a hill district of the Julundhur, from a sandstone formation. That of Peshawur is also sometimes used. The iron appears to be well adapted to the purpose, soft, ductile, and tolerably free from impurity. And here it may be observed that the iron of India, not having undergone fusion, having been separated from the ore by the fire of a fuel free from sulphuric acid, and having been wrought into mass at the expense of infinitely more labor of the hammer than the iron of Europe, is generally pure and soft in proportion. The use of stubbs in this manufacture has never been dreamed of.

The first process is to hammer out a ribband of soft iron of the breadth of $1\frac{1}{2}$ inches, being about 3-tenths of an inch thick at the one end and tapering to a thickness of one-tenth at the other. This ribband at welding-heat is beaten around a cylindric bar, or mandril of iron into a tube about $2\frac{1}{2}$ feet in length, (See Pl. XXVII. figure 1.)

Three or four flat pieces of iron are then laid together and secured in place by wire, (see figure 2.) They are heated to white heat, and set upon the anvil edge upwards ; plates of block tin are laid upon them, which melting fill up the interstices and adhere to the iron ; sometimes about 2 rupees worth of silver are added. The whole at white heat is then submitted to the hammer until the tin and silver are incorporated with the iron. The mass is then worked into long slender square bars, of about one-tenth of an inch in thickness.

These bars or square wires being successively heated are by means of a vice and pincers twisted gradually throughout their extent, one-half

of the number being twisted to the right hand, and the other half to the left, (see figure 2.)

If now it is designed to make a twisted damask barrel, a pair of the twisted bars is secured side to side by wires, and at welding heat is wrought into a ribband, about 2-tenths of an inch wide by one-tenth in thickness. This ribband being heated is twisted spirally around the tube lately formed, (see figure 5.) Both are then covered with mud and being heated to white heat are beaten rapidly with light hammers, and are jumped upon the anvil, until the edges forming the two parallel tubes are welded together, and the tubes themselves have become one.

If not a twisted, but a straight damask is purposed, an inner tube is in the first place formed of plain iron ; as in the above process, around this tube some 16 or 18 of the fine twisted bars are laid lengthwise along the ribband tube ; a left and a right hand twist alternately, (see figure 6.) They are secured in place with wire, covered with mud, and being heated to welding heat, a mandril is introduced, and they are wrought together with light hammers, and jumped upon the anvil, the jumping bringing together the lips of the inner tube. The mud with which they are secured is to preserve them from atmospheric contact whilst at white heat. Considering that it is added whilst they are red hot, I should have supposed the decomposition of the water would have affected the iron even more than atmospheric air. But the workmen are the best judges, and they never omit the precaution.

Long barrels are generally made in two pieces which are welded together. The weld is barely discoverable upon examination and would never be suspected.

The barrel being now formed is to be bored, a process effected in the rudest manner by means of square bits, having at the reverse a hole or socket to receive a wooden lever. The matchlock barrel is wedged into a perforation in an upright post, and the workman, inserting the bit, leans his weight against it, and turns it with a sudden jerk. No precaution is taken to preserve the true centre of the cylinder, and if the bore prove straight or smooth it is a mere accident, for they have no other boring instrument than this. They were surprised to learn that our barrels are bored upon a lathe, and had never heard of the grooved-cylinder of steel, with which we finish the process.

The barrel is now piled smooth on the outer surface, and being carefully cleansed from grease by scouring with wood ashes, is set upright in a hollow cylinder of brass, which is filled with a solution of white vitriol in water. The cylinder is placed upon a slow fire, and in two days' the veins of the damask are developed in high relief.

Nothing can be imagined more elegant than the twisted damask of Koteli. It surpasses I think that of Heraut.

The straight damask being less tenacious than the twisted variety, should be made of greater solidity. Neither can be compared for effective strength with the gun barrels forged according to the English process, in which the barrel being formed, is twisted at welding heat upon the mandril. But, there is no doubt that the Koteli barrels are superior in strength as well as in beauty to ordinary matchlock barrels ; for the whole of the metal becomes consolidated, and rendered fibrous by the intimate twisting of its several parts. The worst feature in the process is the want of care in the construction and finish of the inner surface. The rude measures employed are quite insufficient to assure us that the lips of the ribband have met in every part, or that the square bits turned with no velocity by the hand have effaced those irregularities of surface which endanger the life in loading. The bore, not being a true cylinder, and the ball being seldom wrapped in cloth or leather, it is impossible that the piece should carry with precision, or that with any given charge, it should range so far as a fuzil of the same calibre.

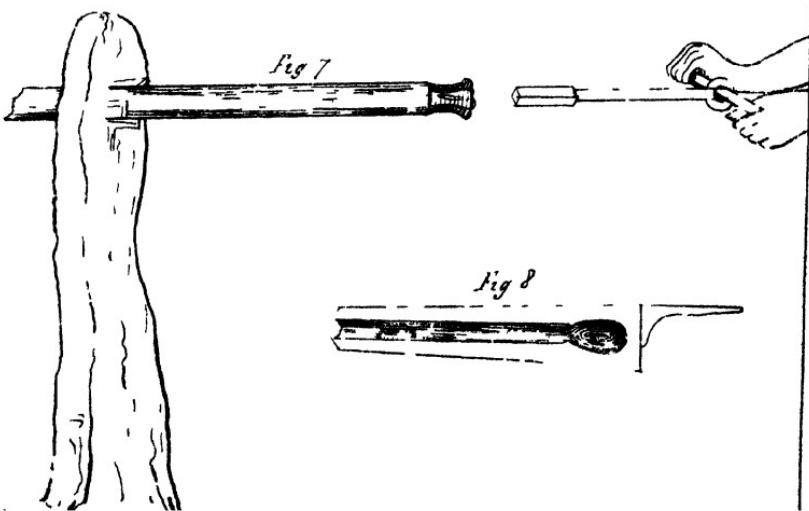
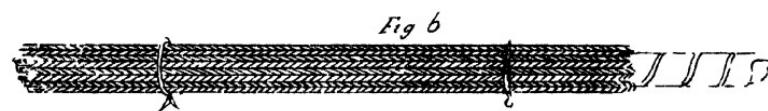
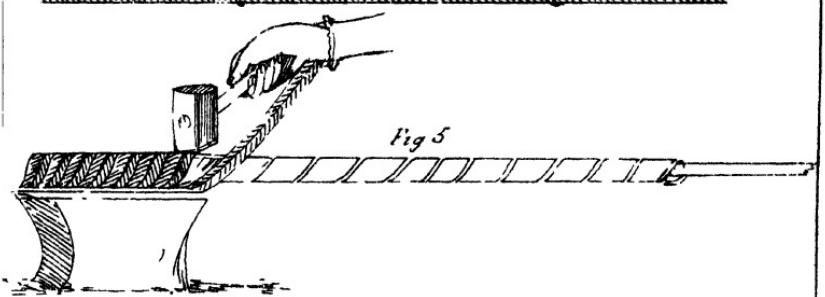
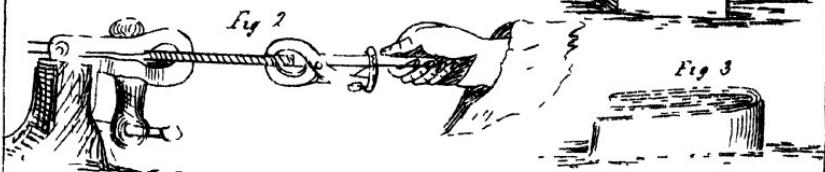
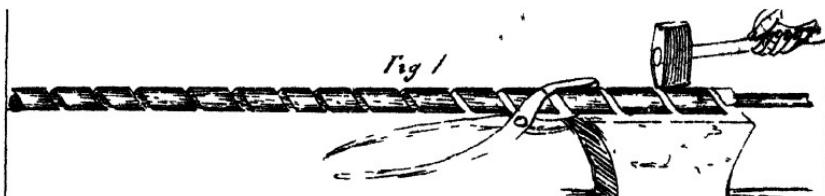
Matchlocks are almost universally constructed with an oviform chamber, which is harmless enough with the weak gunpowder of the bazars, but dangerous when English gunpowder is employed. It no doubt economises the charge. The barrel is made to swell abruptly at the breach to accord with the shape of the chamber, (see plate, figure 8.)

The matchlock of Heraut is generally rifled, a process unknown at Koteli, where however flint and detonator locks are made superior to those of most Indian fabrics. The rifling process is very rudely contrived at Heraut. In a cylinder of hard wood corresponding in length with a gun barrel, two parallel and spiral grooves are rudely chiselled ; a collar of wood is formed in an upright post, opposite to another post, into which the barrel is to be jammed, and within this collar are two

short iron pegs, fitting into the grooves of the cylinder. A boring rod is then firmly attached to the cylinder, the cylinder forming both handle and guide. The boring bit is a cylindric rod rather thicker toward the extremity than elsewhere. Its thickest portion exactly fits the muzzle of the piece. It has a groove at the extremity, into which fits a small sharp wedge of hardened steel. When first inserted into the barrel, this wedge scarcely projects above the surface of the boring rod. It is now introduced into the muzzle, and the wooden cylinder is pushed forward by the workman who leans his weight against it. Of course as it enters the barrel, the spiral grooves of the wooden cylinder being guided by the fixed pegs in the collar give the rod and bit a corresponding spiral motion by which a spiral scratch is made in the interior of the barrel. The wedge is then slightly heightened and the scratch is thus deepened, until the workman considers it sufficient. This process is repeated until six or seven grooves have been formed. The Heraut rifle being carefully loaded with balls wrapped in leather or cloth is tolerably true.

It will be observed that all the beauty and advantage of the Koteli manufacture are attainable without any of the defects attending the rude treatment of the material in an Indian smithy. That is to say, the solidity and the fibrous consistency given to the iron, and the elegant damascene upon the barrels may consist with a perfect inner surface of cylinder. But such barrels could not safely be made so light as our own twisted barrel, a consideration of little moment as regards rifles in which weight is essential to steadiness.

The price of the best Koteli barrel without ornament, is about 15 rupees, or 30 shillings. The fabric is generally considered the best in India.



*A Report of the Kohistan of the Jullundhur Doab.—By Lieut.
WILLIAM HAWTAYNE PARISH, Bengal Artillery.*

1. The alternation, on so large a scale, of marl sandstone and conglomerate, has given rise to some marked features in the physical outline of these hills. Fertile valleys usually intervene between the separate ranges, whilst extensive table-lands sometimes crown their summits. This tract is composed of strata, dipping in general to the north-east, of sand, sandstone, calcareous marl, clay, and conglomerate, arranged in distinct formations, which observe a fixed and invariable order of superposition. It is evident that this country has undergone great changes in its physical geography since these strata were formed; for their direction and inclination have scarcely any relation to the existing drainage of the country. Also, for the more modern valleys, with the horizontal strata at their bases, as well as the hills which encircle them, are all posterior to them in date. Here are presented to us the evidence of a series of events of astonishing grandeur and magnitude, by which the original form and features of the country have been completely altered, but not so far obliterated, but that they may be restored in the imagination. It requires no great effort of the mind to recall its external condition and physical structure before these wonderful vicissitudes began, and whilst it was yet being formed in "the capacious bed of waters." During this early period the various strata of which these hills are composed were gradually formed; and the vast beds of sand, marl, and gravel were deposited. Equal quantities, however, were not deposited in equal periods, for we have convincing proof of some of the strata having been formed in comparatively tranquil waters; whilst the materials of others were hurried along by strong currents and rapidly spread over the localities in which they are now found. In some places, stratified masses more than a hundred feet high, are made up of a succession of strata of fine sand scarcely an inch in thickness, and single layers of small waterworn pebbles; whereas, in other localities, we meet with beds of sandstone and conglomerate, not less than forty feet thick. This era of comparative tranquillity must have been followed, however, by one of violent convulsions, during which this country received the first impress of its present varied outline.

2. The plain of the Jullundhur Doab is bounded to the eastward by a long and narrow range of hills, whose highest ridge does not rise 1,500 feet above it. This outer range, distinguished by the name of the Pamrai-ke-dhar, but better known to Europeans as the Hoshypoor range, extends from the right bank of the Sutlej, from nearly opposite Roopur, to Hajeepoor on the left bank of the Beeasa. Its direction is nearly N. W. and S. E. and its average breadth about eight miles. The Kohistan may be said to be divided into three great longitudinal valleys, more or less distinctly separated from one another and the countries beyond, by the following principal and nearly parallel ranges. Next to the outer range comes the Jaswan-ke-dhar, separating the valleys through which the rivers Sooan and Beeasa, respectively flow. Next in succession to the eastward, is the Chungar or Joala-mukhi-ke-dhar, forming the boundary between the Kangra and Joala valleys : and lastly, the Chumba range, which forms a snowy barrier between this country, known by the general appellation of the "Kangra district," and those of Chumba and Lahoul.

3. The Jaswan Dhoon extends from the Sutlej to within a few miles of Hajeepoor, where it is terminated by the junction of the Pamrai and Jaswan ranges. The river Sooan, rising in Siba at the head of this valley, flows down the centre and empties itself into the Sutlej above Roopur. The surface of the Jaswan Dhoon maintains an almost uninterrupted level, but those of the other two have been considerably disturbed by the upheaval movements, and are consequently more or less subdivided into lesser valleys, which have received different local names. This remark applies more particularly to the Kangra valley, where not only the purgannahs of Palum and Kangra are divided by a range of hills, which connect the Joala and Chumba ones together, but other low ridges have been thrown up, which traverse it in various directions.

4. Although wide longitudinal valleys intervene for many miles between the successive ranges, yet this uniformity in the physical outline must not be supposed to exist throughout the whole extent of this immense District, for it includes Sookeyt, Mundi, and Kooloo, and even a part of Lahoul. The three former lie to the east of the Secunder-ke-dhar, a spur from the Chumba range running direct to the southward. With the exception of the Chumba range, the hills to the west of this spur scarcely attain the elevation of 5,000 feet above the sea, whereas

the mountains on the opposite side are both rugged and lofty, many of the peaks reaching the highest altitudes. Moreover, even to the westward of the Secunder range this alternation of hill and valley has been in some places interrupted. Between Noorpoor and Juck-o-bur for instance, is an irregular mass of hills, intersected by numerous narrow and deep ravines. Such is the case also in the contiguous purgunnahs of Muhulmooree and Kumleh-gur'n, where the low rounded hills of the former, rise up into bold peaks in the latter. But between the treeless hills of Muhulmooree and the Secunder range, a wide valley, named the Seel Khud, intervenes. This valley is some five or six miles in width : and its direction is north and south. There is however, another one, which requires particular notice. Before the Jaswan range reaches the right bank of the Sutlej, it divides into two ridges, and encloses a narrow valley, which is called the Kotlehr Dhoon. The eastern ridge goes by either the name of the Sola-singha ke-dhar or the Chow-mukhi ke-dhar, called after two forts on its summit. The western one is called the Kotlehr ridge. I have thus given a short sketch of the position of each of the valleys on the western side of the Secunder range. A more detailed account would be foreign to the objects of this report ; and, moreover, could not be made intelligible without the aid of a map. It is almost needless for me to add that this part of the country has not yet been surveyed.

5. European geologists have three principal tests by which they determine the relative ages of any set of strata found in a country ; viz., first, mineral character ; secondly, superposition ; thirdly, organic remains. There is also a fourth proof of which they occasionally avail themselves, namely, the fact of any deposit containing the fragments of some pre-existing rocks. As I have not been successful in obtaining any organic remains, I have always endeavoured, whilst prosecuting my inquiries, to be guided by one or more of the remaining tests.

6. The two outer ranges, viz : the Hoshypoor and the Jaswan, are composed of strata of sand, sandstone and gravel, intermixed with variable proportions of clay, mica, and calcareous particles. These belong to the tertiary period, and I think, will be found contemporaneous with those of the Siwalik or sub-Himalayaan range, which has been traced from the foot of the Sikim hills in latitude $26\frac{1}{2}^{\circ}$, and longitude $88\frac{1}{2}^{\circ}$ to Roopur, and now, should I be correct, as far as

Noorpoor. On the summits of these ranges are table-lands of considerable extent. The strata dip mostly to the north-east at angles varying from 8° to 15° . Amongst the strata are others of a harder and more durable sandstone, which being better able to withstand the effects of weathering project from the rest in smooth waterworn ledges.

7. From underneath this sandstone formation, strata of red and blue marls alternating with sandstone have been thrust up. These evidently belong to the great saliferous formation which probably crosses the Punjab from west to east. I have traced it from the banks of the Ravee, beyond Noorpoor, along the base of the Chumba range as far eastward as Mundi. Also from Nagrota, near Hurreepoor, across the Joala valley, into the Pergunnah of Kotlehr, where it makes its appearance in two high and parallel ridges (the Chow-mukhi and Kotlehr.) Between the Joala and Chumba ridges conformable beds of calcareous conglomerate are met with, which are occasionally interstratified with sandstone. The marls are of various colours. Besides the red and blue are others of a purple colour, as well as some approaching to a white. Others again are mottled, having greenish or bluish spots in a dark red base.

8. In consequence of the dip being generally either to the east or north-east, these lesser hills usually present steep precipitous banks towards the plains, and easy slopes in the opposite direction. The two outer ranges send forth numberless spurs to the north-eastward, which descend gradually to the level of the valleys. These hills have evidently been upheaved from a variety of centres, and the elevatory force has not been exerted equally over the whole district. This force, however, nowhere makes its appearance, excepting in the granitic peaks of the Chumba range. In consequence of these unequal disturbances there is a great irregularity in the dip, and although the average may be taken at about 25° , yet in different localities it varies from almost the perpendicular to nearly the horizontal: and although the strata dip in general to the north-east, we find them dipping also in the opposite direction: in fact, no two sections, observed a few miles apart, would, in these respects, give exactly the same results. As far as regards these local details, we find remarkable differences in the Pergunnahs of Kumleh-gurh and Kotlehr. At the head of the Kotlehr Dhoon the hills present a remarkably disturbed appearance. There, a sudden

break in the continuity of the Jaswan range, occurs. There the strata dip towards almost every point in the horizon and have also been thrust up perpendicularly into sharp angular points.

9. Partial formations of lignite are found in different localities, but they soon thin out and disappear. That at Futtipani has been almost entirely washed away by the Guj, during the last rains. After a very careful examination of the strata there, as well as elsewhere within the district, I feel convinced that no true coal measures will ever be found in these hills. The strata are of a more modern date than the carboniferous, and belong to the new red sandstone period. Carbonate of lime is abundantly diffused throughout, and frequently makes its appearance in the form of stalactites and incrustations. Cavernous masses of this calcareous matter are found in all the nullahs, and are used by the inhabitants for making lime. Clay-slate from the Chumba range serves them for roofing ; and some of the sandstones afford excellent building materials. Boulders are generally employed for fencing and paving. Thermal springs are sometimes met with. That at Futtipani appears to maintain a uniform temperature of 104° F. throughout the year. I have taken it on several occasions, and at various seasons, and have always found it the same. The inflammable gas at Joala-mukhi is either carburetted or sulphuretted hydrogen, but most likely the former. There is also a saline spring close by the temple at the same place. The poorer inhabitants obtain the salt by evaporation, and use it for economical purposes. The water of this spring is said to possess medicinal properties, and has been successfully employed in the earlier stages of goitre. May it not possess this property from the presence of iodine ? Boulders and erratics are abundant both on the hill slopes and in the water courses to the east of the Joala range : but with the exception of the bed of the Beeas, and in the neighbourhood of gravel beds, they are nowhere numerous to the westward of that range. They consist of every variety of rock of which the Himalaya are composed.

10. The communication between the Jullundhur Doab and the Kohistan is maintained through the Naree and Cheenee Ghats. Both lead over the Pamrai range into the Jaswan Dhoon ; and are situated, one a few miles, on either side of Hoshypoor. However, a good deal of traffic is carried on by the more circuitous route of Hajepoor,

crossing the Beeas at Rae-ke-puttun. But the principal thoroughfare between Lahore and the Kangra district is through Umritsur, Adeena-nuggur, Puthankote, and up the bed of a nullah to Noorpoor ; or from Adeena-nuggur to Juck-o-bur, on the left bank of the Beeas at Rae-ke-puttun, and from thence along the bottom of tortuous ravines through Dhamata and Nagrota to either Kangra or Joala-mukhi. In this district, as in other mountainous parts of India, coolies, bullocks, asses, and mules are employed in the transport of merchandise. I have, however, occasionally seen camels used for the same purpose. In this district also, are extensive plain and terraced lands at almost every elevation from 1,500 to 7,000 feet above the sea, which yield or are capable of yielding, all the usual productions of the plains, as well as those of the more temperate regions. Although a great extent of surface is under cultivation, yet large tracts may be seen over which the plough has not yet been passed, and which appear peculiarly adapted, both as to soil and situation, for the cultivation of the tea plant. These uncultivated lands, however, afford pasture for large herds of cattle, and numerous flocks of sheep : the latter are kept chiefly for their wool. During the cold months these flocks are brought down into the lower and warmer valleys, but are driven back again on the first approach of the hot season to the more elevated and temperate regions of Kooloo and Lahoul.

11. The principal crops are the sugarcane, rice, wheat, cotton, and gram (*cicer arietinum*.) The rice grown in the purgannah of Kangra is considered to equal, if not surpass, the finest in Hindoostan. It is exported in large quantities to all the neighbouring districts, and is in great demand at Lahore. Sugar and wheat are also exported, but neither gram nor cotton is cultivated in sufficient quantities to supply even the local demands. The price of wheat has doubled since the occupation of the country by the British. Before that event a pucca maund could be purchased for one Rupee, but since then it has averaged two Rupees a maund. The wages of labour, and the prices of all commodities are on the increase. There is a great want of timber for building purposes ; the cheel and the mangoe being the only two available. The bamboo, however, is plentiful. Along the base of the Chumba range are large forests of cheel (*P. longifolia*), oaks (*Q. incana* ; and *Q. lanata*) and rhododendrons. Higher up are also very extensive forests, but of their composition I know nothing.

12. Kumleghur and the valley called the Seel khud are bounded to the eastward by a high range known, as I said before, by the name of the Sekunder-ke-dhar. Its highest peak rises to an elevation of not less than 8,000 feet above the sea, and its general direction is north and south. The next in rotation, and also to the eastward, are the Gogar-ke-dhar, and the Tiri-ke-dhar, beyond which are an endless succession of ranges rising one above another until they attain enormous altitudes. These, forming the rugged tracts of Mundi and Kooloo are lofty spurs from the Chumba range, and run directly to the southward. With the exception of the Chumba the hills to the westward of the Secunder range scarcely attain the elevation of 5,000 feet above the sea. The communication between these lesser hills and the mountainous country beyond, is carried on through three principal routes. The most northern is by following the course of the Beas; the next, over the Gingeytree ghat, is the high road between Kumleghur and Mundi-nugger; and the third is over the Secunder ghat: this last is the direct route from Muholmooree and the Seel khud to Sookeyt.

13. The view from the Gingeytree ghat is very grand and imposing. Looking over Mundi and Kooloo one sees, at this season of the year, the summits of the nearer ranges of Goger and Tiri covered with a temporary mantle of snow: the brilliant whiteness of the latter forming a strange contrast to the dark green of the primeval forests of Pines and Cedar trees, with which their crests are adorned. Beyond these the rugged peaks of Kooloo, bound up in eternal frosts, are seen towering one above another in glittering splendour. To the north the snowy ridge of Chumba forms a magnificent limit to the scene. Turning to the westward, however, a delightful alternation of hill and valley meets your view: there one sees every variety of landscape that could be formed of wood and stream, hills and valleys. But the bare hills of Kumleh-ghur, and the wooded heights of Chungar and Assa-pooree, are insignificant indeed, when compared to the snow-clad peaks of Kooloo. (Assa-pooree is an isolated hill in the Kangra valley.) But of all other sights in these hills the most striking is a view of the Chumba range, when snow has fallen in the Kangra valley, and on the surrounding heights. No words could convey an idea of the sublimity of that range when thus clothed from head to foot in its gelid mantle. It rises ab-

ruptly to the height of 12,000 feet above the valley, and nothing intervenes to shut out the smallest portion of the range. Perhaps nowhere in the Himalaya a view of the like extent and magnificence could be obtained.

14. Sookeyt, the capital town of a district of the same name, is about 12 miles south of Mundi-nuggur ; and is built in the midst of a jungle at the foot of high hills, and at the southern extremity of the Bâll Dhoon. The Bâll Dhoon is somewhat triangular in shape ; the apex is towards Mundi-nuggur, and its base or widest part by the capital. This valley is about 7 miles wide at the base, and perhaps 10 long. It is bounded to the east by the Natchney-ke-dhar, apparently but a continuation of the Tiri range. The Sookeytee river rises near the principal town, and flows northwards down the centre of the valley ; it then winds its way through a narrow ravine for two miles, and at last reaches the Beeas at Mundi-nuggur. This last mentioned town is situated within the angle formed by the Sookeytee river flowing into the Beeas, and is surrounded by high hills. Its position and general appearance put me very much in mind of Rampoor on the Sutlej. Sooltanpoor is the capital of Kooloo, and is likewise situated in a deep and narrow valley, on the right bank of the Beeas, and within the angle formed by the junction of the Serbari with the former river. The communication between Mundi and Kooloo is kept up through the Gogar and Tiri Passes. The former may be about 6,000 feet, and the latter is certainly not less than 9,000 feet above the sea.

15. I cannot help pausing here to notice the very excellent roads the Rajah of Mundi has caused to be made throughout his territory. Although, no doubt the original motive was rather a selfish one, nevertheless his subjects cannot fail to be greatly benefited by them. These roads at first extended no further than just in and about the capital, and were made to enable the Rajah to drive about in his gig. However, the advent of the late Governor General, and the necessity for the Rajah returning his Lordship's visit, were the chief reasons for their extension. During his trip to Simlah he no doubt felt the advantages of good roads, and resolved to follow the good custom of constructing them. But whatever might have been his motives, he nevertheless deserves the thanks of every traveller, and his conduct being held up as worthy of imitation.

16. The Beeas from Sooltanpoor flows direct to the southward for some miles, along the eastern base of the Tiri range, which it afterwards crosses, and flows westward towards Mundi-nuggur. Its course then is to the northward along the western base of the Gogar range. The river, however, turns again after a few miles to the westward, and enters the Kangra valley through a gap in the Sekunder range. At this point of its course, it forms the boundary between Bungall and Kumleh-ghur. It then flows by Ráj-ghirri, and Sujanpoor-Tira. Between this latter town and Nadown it passes through the Joala range, and crosses that valley until it arrives at the base of the Jaswan range near Chumba ghat. Its course for the next few miles is along the eastern base of this range, and through the jaghir belonging to the Rajah of Hurreepoor Golehr. There, however, it makes more westing, and passing above the head of the Jaswan Dhoon flows for a short distance along the foot of the Hoshyarpoor range, and at last enters the plains near Hajepoor.

17. The new red sandstone formation becomes more complicated in Mundi. It there consists of marls, marly-slates, yellow magnesian limestone, salt, and gypsum. The marly-slates are either of a grey or dull red colour. The general dip of the strata is still to the N. E. although sometimes they are nearly perpendicular, or dip to the west. The salt mine of Drung is situated in the eastern face of the Goger range, about 10 miles to the north of Mundi-nuggur, and on the right bank of the Beeas. The salt is seldom found clear and white in any quantity, but almost always, reddened by and mixed with a very large proportion of the argillaceous earth with which it is associated. It is obtained by driving a horizontal gallery into the side of the hill until the salt deposit is reached. The gallery, four feet square, is supported by spars of the Cheel or *Pinus longifolia*, and the inside is lined with bullock hides. There are also salt mines at Gumba near Beijonauth. No reliance can be placed on the contradictory accounts of the produce of these mines. The salt is generally purchased by the poorer classes, for those who can afford it always prefer that brought from the salt range near Peshawur.

18. If we proceed still further to the eastward, viz. across Kooloo in the direction of Mani-karn, we come upon clay-slates occasionally associated with limestone. The clay-slate is of great variety of colour,

as well as of texture. It is frequently soft, breaking up into quadrangular pieces. Sometimes, however, it is met with of a fine texture, of a bluish colour, and splitting easily into slates, when it is used as roofing slate. It derives occasionally, a shining and silky lustre from the minute particles of mica it contains. The clay slate is pierced in many places by veins of quartz, which are sometimes metalliferous, as is the case near the village of Jerree, situated on the left bank of the Parbati, and about five miles below Mani-karn. This vein had been worked, for the galena it produced, by the villagers for some months ; but as they undermined they took no precautions to prevent the superincumbent mass from falling in. This circumstance occurred during the last rains, and the owners have not thought it worth while to re-open the mine ; so the working could not have proved a very profitable employment. The limestone is bluish in colour, compact and hard ; also partially diffused, when compared with the clay-slate. Sometimes it is non-effervescent, and also becomes silicious. Gypsum is found associated with the limestone in some situations, as near Jerree.

19. The Parba or Parbati flows along the base of a deep and winding ravine, the crests of the hills on either side rising some 4,000 feet above it. Their slopes are adorned with forests of Pines and the Deodar, and their summits are covered at this season of the year with snow. In many places the Parba is both wide and deep, but at Mani-karn it is a foaming torrent, bounding over the rocks in noisy cascades. This river comes from the eastward, and empties itself into the Beas a couple of miles above Bajoura. Mani-karn is situated on the right bank of the river, about 20 miles above this point. The place is celebrated on account of the boiling springs, which issue from the ground a few feet above the icy stream of the Parba. The springs are numerous, and the flow of boiling water copious. I regret not having had a thermometer graduated sufficiently high to have enabled me to ascertain the exact temperature of the water ; but its heat is sufficiently great to enable the pilgrims, who annually resort there, to cook their rice in it. Whenever the wind lulls, the steam from these springs rises up in a perpendicular column full 100 feet high.

20. The hill, at the base of which Mani-karn is situated, is composed partly of limestone and partly of clay-slate. The dip is nearly perpendicular, and the strata are traversed by veins of quartz. The

water has an unpleasant taste, and deposits a large quantity of calcareous matter. The newly formed deposit from most of the springs is of a rusty brown colour, but that taken from one of them is of a brick red. In one place I remarked a mass of this singular deposit, nearly two feet thick, and hardened into a compact rock. This mass is divided in three distinct portions, or stratifications, and each is of about the same thickness. A spring, therefore, after having formed the first deposit, must have ceased to flow for a short period, and then burst out again, and so on until the three were formed; when it must have ceased to flow altogether, or have burst out in another spot. I have preserved a small portion of each, as well as of other rocks. The elevation of Mani-karn must be considerable from the circumstance of Cedars, the *P. excelsa*, the *A. Smithiana*, oaks and rhododendrons growing luxuriantly on the river's edge. The *P. longifolia* is also found there in great abundance.

21. I have mentioned in the former part of this report that boulders and erratic blocks are to be seen scattered in the ravines and water-courses as well as reposing on the hill sides. I will now endeavour to furnish some additional particulars regarding them. In the two outer ranges the table-lands and the beds of the water courses are generally covered with small waterworn pebbles similar in size and composition to those found in the adjacent gravel, from which they have evidently been derived. Boulders of every description and of a moderate size also cover the bed of the Beeas. But it is only when we get to the eastward of the Jala range that we encounter granitic blocks of enormous dimensions.

22. Among the many mountain torrents that take their rise in the snows of the Chumba range, there is not one whose banks are not more or less covered with large erratics. These streams appear to have cut their way through several hundred feet of strata, leaving flat terraces at different levels and at corresponding heights on both banks. On these terraces and on the shelving banks granitic blocks are seen lying either in heaps or scattered about indiscriminately. They are also found on the more elevated lands, and reposing on the hill-slopes either partially embedded or lying on the surface.

23. Those found in the latter situations were probably deposited there before this country received its present outline: but the fact of

their being also found in heaps along the banks of the torrent beds seems to point to the probability of floods having occurred at certain intervals since that period. In this opinion I was confirmed when I came to examine the course of the Guj, from the Chumba range to the point where it flows into the Beeas; and also when I saw the effects of a flood that occurred during the rains of 1845, when the latter river rose nearly 60 feet above its usual level. This flood lasted for 10 days, and did an enormous amount of damage to the villages and cultivated fields situated on the banks of the river. Between Sultanpoor and Bajnoura considerable patches of land which, before this occurrence, yielded luxuriant crops, have since been abandoned, on account of the great number of boulders, the trunks of trees, and especially from the quantities of fine sand that were spread over them by the swollen torrent. In many places the river cut out new channels for itself, and in others, permanently enlarged its bed. In fact, throughout the length of its course in these hills the marks of this flood are everywhere traceable. The timber it brought down and deposited on the Government lands alone sold for 3,000 Rs.

24. The Guj rises near Rilloo at the foot of the snowy range, and flowing across the Kangra valley enters a tortuous ravine. Again, issuing from this at Nagrota, it joins another stream, in the Joala valley, and finally empties itself into the Beeas. The bed of this stream at the base of the Chumba range is nearly choked up with blocks of granite. There they appear not so much waterworn; their edges are sharp and angular; and their shapes somewhat cubical. We find them also all along the banks, and in the bed of the stream as we proceed downwards to Futtipani. There the ravine, through which it flows, widens into a small valley about $1\frac{1}{2}$ mile in length, and a $\frac{1}{4}$ broad. There also gigantic blocks of granite are seen lying in confused masses, and heaped one upon another on the river's edge, also from 20 to 30 feet above the stream. Their present position in heaps, piled confusedly one upon another, indicates that this small stream either is, or has been, subject to occasional extraordinary inundations, at which periods it has transported these vast blocks, and thrown them up upon its banks: and although erratics are scattered singularly about the valley, and in the bed of the stream itself, yet one cannot but consider the fact of their being found in heaps and at different heights and distances along the

banks, shows that there has been not only one, but several inundations in succession, and, moreover, that some were greater than others. One cannot look upon each heap, but as the lasting memorial of a particular flood, marking the exact spot, where it had exhausted the greater part, if not the whole, of its transporting powers.

25. Now the difficulty is, how to account for the origin of these floods, which have left so many traces of their occurrence behind. There seems to be but one mode of accounting for them; viz: the escaping of pent up waters from the different valleys. It appears almost certain that for a considerable period after this country was first upheaved, large bodies of water were retained in the hollows formed between the ranges. I think there cannot be much doubt about the valleys having been lakes for a considerable period after their first formation; for all along the Jaswan Dhoon are thick horizontal deposits of loose sand and gravel of comparatively modern date. Also in the Kangra valley are thick beds of clay, or sandy-clay with ~~large~~^{many} boulders embedded. These boulders are mostly of granite and clay-slate, and were derived, most probably, from the Chumba range. Now, as the pergunnahs of Riloo and Kangra form the lowest portions of the valley in question, the course of the Guj would be one of the natural outlets, by which any body of water which remained behind, would escape: and the different bodies of water, escaping from time to time, would necessarily carry with them the loose materials, which in any way obstructed their progress, and would deposit them in the manner we now find them.

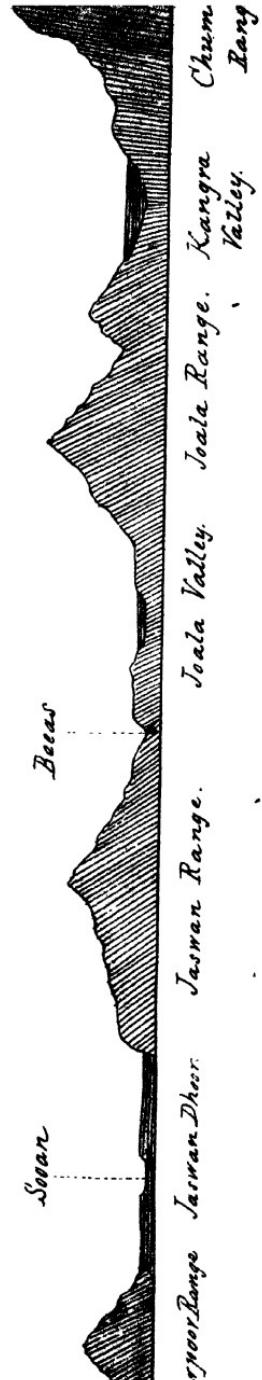
26. The boulders embedded in the clay are in every stage of decomposition. In many instances nothing but the faintest outline is left to mark the original size and form of the boulder. It then can only be distinguished from the matrix by the difference in the colour, and in the composition of the materials. When travelling in the hills near Simlah, I frequently remarked in the clay-slate certain circular rings, within which the materials were of a more sandy nature, and also much less compact, than those composing the indurated clay. I then felt puzzled to account for their presence, but now the striking similarity between those and the ones I have since seen in the softer clay of the Kangra valley, induces me to attribute to them a common origin.

27. Before concluding this report, I beg leave to make a few

remarks on the present condition of the people. Since the time when this country first became a British Province a new order of society has been gradually springing into existence. Heretofore the bulk of the inhabitants were kept in a state of abject poverty by a few Sikh Sirdars in whose hands all the power and the wealth of the land were concentrated. By these unprincipled tyrants every species of mental and bodily despotism were practised upon the unfortunate people. But a new order of things has been created ; freedom and prosperity have marked the advent of the British. Life and property have been secured, and feudalism has been for ever abolished. Wealth is being more equally diffused, and a middle class is arising to unite the two extremes of society, which have unhappily too long existed. The foundation of a new order of society has thus been laid which will form in a short time the connecting link between the Government and the nation. The advantages to be derived from such a change are incalculable. To be convinced of its importance we have merely to trace the progress of English society from the Norman conquest to the present time. If we compare the time, when the English people were serfs, and the feudal Barons the very counterparts of the domineering Sirdars, to that of the present day, when the wealth and intelligence of the British nation are concentrated in the middle ranks, we cannot fail to be struck with the beneficial results of the change. On the other hand, the present condition of Spain affords us a melancholy illustration of a nation possessing only two ranks of society ; where the haughty and indigent Hidalgo may be compared to our proud needy Suwars. It is wonderful however to reflect on what has been already accomplished for the benefit of the people inhabiting these hills since the conquest of the country. Slavery has been abolished ; the rites of Suttee prohibited ; and the preodial spirit checked :—in fact, all traces of barbarism have been swept away in the short space of two years. It has always been considered an indication of a rising country when the produce of labour, and the rate of wages are simultaneously on the increase ; but here we have an additional proof of the improved condition of the country, viz. in the increase of cultivation. The waste lands are being gradually redeemed ; and the men, who before were satisfied with a bare existence, are now looking after their domestic comforts, and are daily becoming more useful members of society. The people are mild and tractable,

XXVIII

- Sandstone
- Siliferous
- Clay slate.
- Granite



and not so fond of litigation, as their brethren of the plains. They are also more truth-spoken, and are not equally given to theft. However the physical structure of the country may act as a bar to the extensive perpetration of the latter species of crime, from the difficulty, not to say almost impossibility, of carrying away the plunder, and the consequent certainty of detection and punishment. I am sorry having to mention that the inhabitants of the higher hills are addicted to drinking large quantities of spirituous liquors. I am afraid too that the Lahoul-ees are sad drunkards. They pass six months of the year in Kulu, on account of the severity of the cold season in Lahoul, and spend the greater part of that time in dancing and drinking. But where is there a race, who possess not passions to be dreaded, prejudices to be humoured, and virtues to be developed? But if our justice be tempered with expediency, our principle with policy, and our benevolence with moderation and prudence, we may look forward to the ~~faulle~~ with glowing anticipations, and Britons may eventually become the dispensers of still greater blessings to these submissive people.

The annexed diagram may give the idea of the configuration of the surface, attempted to be described in the body of the Report, such as may be seen in passing from the plain of the Jullundhur Doab to the Chumra Range. It has been necessary, however, to exaggerate the inclination of the beds, and the heights of the several formations, as compared to their horizontal extent. The total distance may be taken at about forty miles.

Memorandum by Capt. A. CUNNINGHAM, detailing the boundary between the territories of Maharaja Gulab Singh and British India, as determined by the Commissioners, P. A. VANS AGNEW, Esq. and Capt. A. CUNNINGHAM, of Engineers.

In laying down a permanent boundary through a mountainous country it appeared to the Commissioners desirable to select such a plan as would completely preclude any possibility of future dispute. This the Commissioners believe that they have found in their adoption as a boundary of such mountain ranges as form water-shed lines between the drainages of different rivers, as detailed below.

2. In 1839, when Capt. A. Cunningham surveyed the Láhul district the boundary between the states of Kulu and Chamba was formed by the Nalda and Chukam Nullahs, two tributaries of the Chandrabhágá, the one on its left and the other on its right bank. From the head of the Chukam Nullah the Commissioners determined that all the country to the eastward which is drained by the Bhágá, the Chandrabhágá and their tributaries belonged to the British district of Láhul; and that the boundary between Láhul and the Zanskár district was the snowy range (called Paralassa by Dr. Gerard) dividing the drainage of the Bhágá and Chandrabhágá from that of the Zanskar river, as marked in the Map. (Pl. XXIX.)

3. Beyond the Bara Lácha Pass to the eastward, the Commissioners found that there was an old well known boundary stone, called Phálangdanda, which marked the limit between Láhul and Ladák. This stone is noticed by Moorcroft (I, p. 220). It stands in the midst of an open plain on the right bank of the Yunam River. As there was no known or recognized boundary mark on the other side of the stream, the Commissioners selected a remarkable cream-coloured peak, called Turam, as the northern limit of the British territory on the left bank of the river. As this peak is situated at the end of one of the spurs of the great snowy chain, already determined as the northern limit of the Láhul district, it forms a natural continuation of the boundary line from the westward. The bearing of the Turam peak from the Phálang-danda is 9° to the northward of west.

4. As it appeared that the country to the eastward of the Phálang-danda belonged to Piti, the Commissioners determined that the boundary between Piti and Ladák on the westward should be the Yunam River. A straight line was accordingly drawn from the Phálang-danda to the junction of the first Nullah on the right bank of the Yunam, from which point the Yunam River forms the boundary as far as the junction of the Cherpa or Cherep river.

5. Almost due north-east from this junction there is a remarkable square rock on the top of the hill, which from its resemblance to a fort has received the name of Lanka. This curious and well known peak was selected as another fixed point in the boundary, to which a straight line should be drawn from the junction of the Cherpa river. Beyond this to the eastward, the Commissioners, adhering to the

principle which they had first laid down, determined that the whole of the Cherpa valley and its tributaries belonged to the British Government; and that the snowy range on its right bank which feeds all the northern affluents of the Cherpa river should be the boundary between Ladák and the British district of Piti. This same range extends towards the east past the southern end of the Chhu-Mureri Lake, where it forms the well known boundary between Ladák and the Chinese territory. The Commissioners therefore determined that the boundary between Ladák and Piti should continue from the head of the Cherpa along this same range to the Chinese boundary; thus including within Piti all the streams which water that district, and giving to Ladák all the streams which water its southern district of Rútchú.

On the Oology of India :—a Description of the Eggs, also Nests, of several Birds of the plains of India, collected chiefly during 1845, '46. By Captain S. R. TICKELL, Civil employ.

Oology is a part of Ornithology which has either engaged very little attention in India, or has been passed over unattempted from the difficulties attending the collection of eggs and nests,—difficulties arising in a measure from the season of the year in which they are chiefly procurable, but principally because very few birds build and breed in this country, except in the remotest parts of jungles, which are during the rainy season almost inaccessible from the density of vegetation. In the limited collection I have been able to make, native agency has of course been employed; and to avoid adopting the mistakements, ignorant or wilful, of my “deputy collectors,” has cost me no little patience and sundry cross-examinations. Many evil disposed boys have, for instance, brought me the eggs of Mynas over and over again, placed in wonderful nests of their own constructing, to be passed off as the produce of the rarest species of birds. An old woman on one occasion paraded some tame ducks’ eggs, as just procured from the nest of a species of wild fowl, at that epoch probably busy breeding in Iceland. And several similar attempts at duplicity have occurred, for the sake of enhancing the price, of which the wary Oologist must take good heed.

In the following description the size of the eggs is expressed by a

lengths of the long and short axes in inches and fractions of an inch, and the term "ordinary" is applied to the shape of the common hen's egg, as typical.

1. *Haliaëtus Macei*.—The "Kokna" or "Oogoos" of the natives. Nest large—massive—about 3 feet in diameter—composed of sticks, twigs, and lined with hay; concavity shallow; usually in the fork of a Peepul or Bur tree, and near water; eggs two; shape ordinary; rather blunt; color plain white; long axis $2\frac{3}{8}$. This Eagle never makes the slightest attempt at defending its nest—a striking contrast to the marvellous tales we read of, concerning the Golden Eagle in the Highlands of Scotland, &c.! Lays in December and January.

2. *Gyps bengalensis*.—"Gid" or "Girnee." Nest very large, massive, shapeless, irregular in size, being sometimes disproportionately small, composed of branches and twigs lined with hay and down, placed high up on large trees, near or quite at the summit. Egg usually one—ordinary shape, or rather lengthened; size $3\frac{3}{8} \times 2\frac{7}{16}$; colour dull brownish white. Lays in December or January.

3. *Strix longimembris*, Jerdon : *Str. javanica* apud Latham. Little or no nest—at most a little grass scattered and smoothed down—in the midst of heavy grass jungle, always on the ground. Eggs usually four in number, round, pure white; size $1\frac{3}{4} \times 1\frac{3}{4}$. November or December.

4. *Orthotomus longicauda*.—Nest the size of an orange; globular, of fine hay, scantily lined with a cobwebby cottony substance, attached to the stalk of an annual weed, the adjacent leaves of which are made to adhere to the sides by numerous irregular stitches, formed by passing the hay in and out through the leaves, one of which is usually bent over as a roof to the entrance. Eggs 4 in number. Size $\frac{1}{2}\frac{3}{5} \times \frac{2}{3}\frac{9}{10}$, blunt shape; colour pale greenish blue, with irregular patches, especially towards large end, resembling dried stains of blood, and irregular broken lines scratched round, forming a zone near the large end. August.

5. *Hydrophasianus sinensis*.—"Dulkookra.") Nest large, flat, thick, of weeds and coarse water mosses placed on reeds and floating on the water; upwards of $1\frac{1}{2}$ foot in diameter. Eggs 4 to 6 or 8. Spindle-shaped, being very broad at big end and tapering at smaller size; $1\frac{3}{10} \times 1\frac{1}{5}$; color plain bronze or olive brown. August.

6. *Bucco asiaticus, v. cyanops*.—"Suttra.") Nest hemispherical, 5 inches in diameter, coarse; outer covering of tendrils and dry grass,

with the cottony blossoms of jungle grass plastered on : lining of fine hay. Eggs 4; shape ordinary, size $1\frac{7}{10} \times 1\frac{1}{10}$; color plain white, soiled with faint brownish here and there. Found in a Mowhooa tree, near jungle. August.

7. *Ploceus philippinus?* *Pl. baya*, Blyth.—("Baya.") Nest very large ; pendent ; from 2 ft. to $1\frac{1}{2}$ ft. in length, attached to branch by a long neck ; body of nest ovo-globular, the whole solid except a spherical space near bottom, which is entered from below sideways and contains the eggs, &c. Nest composed entirely of fine hay, without any other lining ; sometimes two or three joined together. At all times several on the same tree, which is chiefly the palm, or Khujoor, or any large tree of spreading branches and scanty foliage, especially if leaning over water. Eggs 6 to 10 in number, pure white, shape ordinary, size $\frac{27}{32} \times \frac{19}{32}$. August.

8. *Ardeola leucoptera*, (*v. malaccensis*, Auct.)—Common brown Pad-dy-bird ("Chota bug.") Nest large, 1 ft. in diameter, shallow, ~~coarsely~~ made of dry twigs, generally on a mango or any medium-sized tree near water ; often in company with nests of the Crow and Myna. Eggs 6 or 7, much rounded and broad ; pale bluish-green. Male egg $1\frac{9}{16} \times 1\frac{7}{32}$; female egg $1\frac{7}{16} \times 1\frac{3}{16}$. August.

9. *Herodias bubulcus*, *v. russata*, &c.—("Gow bug.") Nest as in preceding : often several on the same tree. Eggs 2 or 3 ; narrower and longer than in *A. leucoptera* ; same colour ; size $1\frac{25}{32} \times 1\frac{5}{32}$. August.

10. *Columba (Turtur) suratensis*.—("Googoo.") Nest large, flat, of dry twigs, lined with ~~hay~~ ; on a Mowhooa or Mango tree. Eggs 2 to 6 ; ordinary, rather blunt, pure white : size $1 \times \frac{13}{16}$.

11. *Turtur risoria*.—Indian Ring-dove, ("Pundook.") Nest and eggs as in preceding, but larger $= 1\frac{3}{16} \times \frac{7}{16}$. August.

12. *Dendrocygna arcuata*.—Whistling Duck ("Sillee" or "Sáral.") Nest large, flat ; when on the ground made of reeds, flags, &c. hidden in the rank grass, sometimes half floating on the water. Often on the bole of a mango or peepul tree—at the base of a large fork, or in a hollow on the summit of the trunk, when it is composed of twigs, with hay. Eggs numerous, from 6 to 8 or 10. Shape a little lengthened, with both ends blunt ; pure white with a blush of faint rose-colour and clouds of opaque white ; size male egg $2 \times 1\frac{7}{16}$; female egg, $1\frac{11}{16} \times 1\frac{1}{2}$. July and August.

13. *Nettapus coromandelianus*, v. *girra*.—"Fixbaggonets"—"Gy-ree" of the natives. Nest and eggs resemble those of preceding in locality and all other respects, except size, which was not taken by measurement, but is of course much smaller. Eggs very numerous, once 14 were brought me. This duck builds more constantly in trees than does the whistling teal. A pair built on a mangoe tree in the town of Poorulia, and must have had to carry their young at least $\frac{1}{2}$ mile to the nearest water!

14. *Sarcidiornis regius*.—"Nukwa hunss." "Knobbed Goose." The eggs of this bird have also frequently been brought me, but I did not take the measurement; they are about as large as those of the domestic duck, pure white; from 8 to 10 or 12 in number. Nest frequently on the hollow top of a decayed trunk, always in jungly country and near the water. They are hatched in August and the ducklings, which are early deserted by the parent birds, wander about during the ensuing cold weather in a small flight by themselves; they are then of a dusky colour above and dull white beneath; the gander has no trace of a frontal knob till after the cold season. I have had this bird as well as the "fixbaggonets" and "whistling teal" hatched by domestic hens, but they are never thoroughly tamed.

15. *Hemipodius bengalensis*, Blyth, MS. ("Salooi goondroo.") The larger Button Quail. No nest but a hollow scraped in the ground and lined with a little hay; generally in a field of "Goondlee" (a kind of small grain like millet,) or in short jungle grass. Eggs 4; size $\frac{1}{8} \times \frac{2}{3}$; very round, but rather pointed at smaller end. Brownish white thickly, mottled darker; with larger spots and blotches of dark brown thickly sprinkled over the large end half, and small specks of the same elsewhere.

16. *Pratincola caprata*.—"Pidda.") Nest hemispherical; 4 in. diameter; of fine grass, built on a bush in waste jungles or reedy spots. Eggs 3; size $\frac{2}{3} \times \frac{9}{16}$ shape ordinary; colour pale greenish white, sprinkled equally with brown spots. May.

17. *Cisticola cursitans*.—"Khér ghoosa.") Little common Grass Warbler. Nest hemispherical; rather large; 5 inches diameter; thick. Entirely of soft grass with its downy ears. Eggs 5; ordinary; blunt, $\frac{2}{3} + \frac{1}{2}$, opaque white, sprinkled with rusty specks, which conglomerate in a zone round large end. Builds at the bottom of thick clumps of reeds. June.

18. *Malacocercus Earlii*.—"Burra phenga." Nest hemispherical; of grasses, rather loosely interwoven: generally on bushes in jungle. Eggs 2 to 4; $\frac{3}{2} \times \frac{1}{2}$; rather lengthened shape; clear dull verditer blue. June.

19. *Malacocercus caudatus*, (Dumeril).—"Chota Phenga." Nest precisely the same as foregoing. Eggs also, but size somewhat less, $\frac{1}{2} \times \frac{1}{2}$. (The bird was snared and brought to me with the nest.) June.

20. *Mirafra affinis*? Jerdon.—"Leepee." Nest ordinary, of grasses. 4 inches diameter, placed on the ground, under shelter of clods, tussocks of grass, &c., in fallow fields or open patches in jungles. Eggs 3 or 4, ordinary, rather lengthened, $\frac{1}{2} \times \frac{1}{2}$, dirty ashy-white, with stains, smudges and specks of dusky, ashy, and rusty-brown.

21. *Mirafra phoenicura*.—"Koowan leepee." Nest flat, shallow, circular, 4 inches diameter; placed in meadows, in long grass, which it entwines over the nest, leaving only a small passage open. Eggs 4; lengthened, blunted; $\frac{7}{8} \times \frac{5}{8}$; dirty greenish-white, thickly sprinkled with pale and dark brown confluent spots. June.

22. *Sturnus contra*.—"Ram buncree" of the Bengalees. "Goochia Sharo" of Hindustanees. Common Pied Myna. Nest large, circular, shallow, sometimes a foot in diameter, of twigs, grasses and down, high up in Mangoe, Mowhoa, or Doomoor trees; often on bamboos. Eggs 5, $1\frac{1}{2} \times \frac{1}{2}$, ordinary—clear greenish verditer-blue.

23. *Caprimulgus albonotatus*, mihi. "Jungle Nightjar." "Chappa." No nest. Eggs laid on the bare ground, in bush jungle, generally 2; shape blunt and both ends nearly equal. Male egg $1\frac{7}{8} \times \frac{1}{2}$, pale fleshy-clay colour, sprinkled with patches of darker brownish-red; female egg $1\frac{3}{8} \times \frac{1}{2}$, paler and redder.

24. *Oedicnemus crepitans*.—Thick-kneed Plover. "Khurma." Nest a small patch of grass, moss, and thistle or seed down, about 5 inches diameter, placed on the gravel, in jungle, without attempt at concealment. Eggs 2; $1\frac{1}{2} \times 1\frac{1}{2}$; shape ordinary, rather blunt, pale clay colour, splashed and blotched with dark brown. June and July.

25. *Drymoica sylvatica*?—"Tot rungee." Nest very neat, compact, deep, globular; 3 inches in diameter. Coarse grasses outside, fine grass within, the edges cleanly defined; attached to reeds, rushes, &c. Eggs 3, blunt; size $\frac{3}{4} \times \frac{1}{2}$. Fleshy white, with patches and scratches as of dried blood; darker spots showing through shell. June.

26. *Nectarinia asiatica*, (v. *Cinnyris mahrattensis*, Sykes.)—"Joogí joogí." Nest bulbous, bottle-shaped, with lengthened neck, suspended from the end of a small branch, in thick bushy trees, gardens, banks of tanks, seldom far in jungle. Nest soft, composed of little bits of leaves, grasses, fine twigs and chips of bark woven together with a fibrous substance resembling tow. Entrance by a small circular hole at bottom and side lined neatly with seed down; length 8 inches. Eggs $3\frac{1}{4}$ inch long, rather pointed; pale greenish white, minutely speckled dusky, which forms a clouded zone round larger end.

27. *Sarcophorus bilobus*, (Gm.)—"Chota Teet'huree." No nest. Eggs found on the ground exposed; 2 in number brought me; shape blunt and round; $1\frac{3}{16} \times 1$. Sandy or pale clay colour thickly blotched over with very dark brown clouds and spots. June.

28. *Lobivanellus goënsis*.—"Teet'huree." "Indian Peewhit." No nest. Eggs 6 to 8 or 10, on the ground, amid bushes, &c. in jungle or among the bushes on sand islets in large rivers; shape round and pointed at lesser end. Male egg $1\frac{1}{16} \times 1\frac{3}{16}$; pale clay, blotched as No 27, but not so thickly and closely. Female egg $1\frac{5}{8} \times 1\frac{1}{8}$, with smaller spots more thickly sprinkled over.

29. *Eudynamys orientalis*.—"Koël" or "Kokeel." June 1845. 4 eggs brought me, placed in a Crow's nest; blunt at both ends. $1\frac{1}{4} \times 1\frac{1}{16}$; dull sap green, sprinkled all over dark brown, especially round large end. There was one Crow's egg in the nest and both are strikingly similar in appearance.

30. *Corvus splendens*.—"Khunwa," Indian Crow. Nest large, irregular, some are flat, others deep, composed of branches, twigs and hay. Eggs 4 or 5. Lengthened and both ends rather sharp; $1\frac{9}{16} \times 1\frac{1}{16}$. Sap green, clearer and bluer than Koël's egg, and markings more speckled dark and light. June.

31. *Lanius phœnicurus*.—"Khèr Khetta." Nest in large bushes or thickets, shallow, circular, 4 inches in diameter, rather coarsely made of fine twigs and grass. Eggs 3 ordinary; $\frac{2}{3} \times \frac{2}{3}$; pale rose colour, thickly sprinkled with blood red spots, with a darkish livid zone at larger end. June.

32. *Cypselus palmarum*.—"Tal chutta." Nest was not brought me. Eggs $\frac{2}{3} \times \frac{1}{2}$ (immensely large for such a bird); rather blunt, white, with rather large spots of deep claret brown, most numerous at big end. July.

33. *Cypselus affinis*.—"Babeela" or "Ababeel." Nest large, flat, irregular, of fine straw, hay, and feathers, closely interwoven and kept together with a glutinous substance supplied from the bird's salivary glands, generally glued against some beam in a veranda or out-house, in some remote corner. Eggs 3, shape lengthened, spotless, white. Male $\frac{2}{3} \times \frac{1}{6}$; female $\frac{2}{3} \times \frac{1}{6}$. July.

34. *Passer domesticus*, var? *indicus*, Jardine and Selby.—"Gooria" or "Moonia." House Sparrow. Nest very large, about 8 inches in diameter, irregular shape, made of any material at hand, generally straw outside, finer grass and feathers within, with bits of cloth, cotton, tow, paper, &c.; in outhouses, under thatched eaves, loopholes in walls, down wells, and (rarely) holes of trees. Eggs 5 to 8 or 9; $\frac{2}{3} \times \frac{1}{6}$ ordinary, pale ash, thickly sprinkled with dirty rusty brown; breeds in March, June and October.

35. *Geronticus papillosum*.—"Karankool." Black Curlew of sportsmen. Nest very large, flattish; of branches, twigs, and hay, on large limbs of the Seemul and such lofty trees. Eggs 2, ordinary, pure opaque white. Male $2\frac{3}{16} \times 1\frac{1}{16}$; female $2\frac{1}{16} \times 1\frac{1}{16}$. July.

36. *Anastomus coromandelicus*.—"Tont'h bhunga." Nest large, flat, thick, of branches, twigs and grass within; found in numbers together on large limbs of lofty trees, chiefly the Seemul, together with nests of Kites, Night-herons, Black Ibises, &c. Eggs 4; rather lengthened; dull white. Male $2\frac{1}{2} \times 1\frac{1}{2}$; female $2\frac{3}{4} \times 1\frac{1}{4}$. July.

37. *Grus antigone*.—"Surhuns," Syrus of Europeans. These eggs have been frequently brought me in Singbhoom and also in Manbhoom, where they are tolerably common, but I omitted taking the measurements and describe the egg from memory; (I have one in my collection, to which I cannot at present refer.) Length about $3\frac{1}{2}$ by $2\frac{5}{8}$, but the male egg is longer than the female, colour plain white, not quite so pure as in the domestic fowl; without spot or mark of any kind; generally two in the nest, which is a raised heap of grass, rushes, &c. placed in heavy grass jungle in retired places, generally at the foot of hills covered with forest. July.

I cannot understand the difference of colour between my specimens and that of an egg presented to the Society, said to have been laid by a Syrus, in Calcutta, and described by Mr. Blyth in a recent number of the Journal. I can only say I describe the egg from upwards of a

dozen brought me at different times by natives, together with young ones in all stages.*

38. *Podiceps minor*.—"Pundoob." Dobchick. Nest very large, flat, of interwoven weeds, grass, water mosses, &c. floating but moored to reeds, &c. Egg solitary (?), very large for the bird, pointed at both ends; $1\frac{1}{2} \times 1$. Dirty white, marked with pale brownish stains. July.

39. *Coracias bengalensis*.—"Tâs" or "Neel Khunt." Indian Roller. Nest rather large, thin, scanty, of twigs and grasses within, loosely put together, on medium-sized trees, generally at summits and near water. Eggs 4 or 5. "About the size of a Dove's," broad but rather pointed at ends, full deep Antwerp blue. July.

40. *Halcyon smyrnensis*.—"Much runga." Nest not brought me. Eggs 3, very round, $\frac{2}{3} \times \frac{2}{3}$; semi-transparent and fleshy white.

41. *Acridotheres tristis*.—"Bunnee" or "Saloo," common *Mynar*. Nest large, coarse, of twigs, and grass within, on trees or in out-houses, verandas, &c. Eggs 4, $1 \times \frac{2}{3}$; rounder than eggs of *Sturnus contra*—pale greenish blue. July.

42. *Dicrurus macrocercus*: *D. albivictus*,† (Hodgson). "Finga," "King crow." Nest made on summits of thick bushes, or midway up medium-sized trees. Concealed in the trunk; hemispherical, 6 to 8 inches in diameter, of coarse grasses, fibrous roots lined with finer grass and wool. Eggs 3 to 5, ordinary, $\frac{1}{8} \times \frac{1}{8}$; dullish white, with scattered blots and spots of pale brown, especially at blunt end. June.

NOTE. Several of these nests and eggs were brought to me and by some averred to be of *Lanius nigriceps*, Franklin. But, unless satisfactorily known to the contrary, I am inclined to attribute them to the Fingah.

43. *Ciconia leucocephala*: *C. bicaudata*, (mihi). The "Manik-jore." Nest large, flat, of branches and twigs and lined with hay, sometimes fragments of snakes' skins—high up on lofty trees, such as the Seemul. Eggs 3, ordinary, $2\frac{1}{2} \times 2$; plain white.

44. *Pycnonotus bengalensis*.—Common "Bûlbûl." Nest small, hemispherical, 4 inches diameter, of fibrous roots and fine grasses. Eggs

* The egg described by me was one of several produced by the female of a pair of tame Sarrus, and there can be no mistake respecting it.—E. B.

† It is surely better to adopt this most characteristic specific than adhere to the old "macrocercus," which to this hour it is impossible to say, applies to this bird or to "annectans," (Hodgson). "Bulicassius" being equally confounded with the two.

3 or 4; ordinary, rather lengthened; $\frac{1}{2} \times \frac{9}{16}$; pale rosy white, thickly and equally sprinkled with confluent blotches of claret colour or purpureous rusty.

45. *Gallus Bankivus*.—“Bunkookra,” “jungle moorug.” Of these I took no note, as they are precisely the same as the eggs of the Bantam fowl. The jungle hen lays in clumps of bamboo, dense thickets and such inaccessible places, and makes a rude but comfortable nest of straw, dried weeds and leaves, round which the dust is scraped and heaped up. The eggs are generally 6 to 10 in number.

On the Ruins at Putharee.—By Capt. J. D. CUNNINGHAM, Political Agent, Bhopal.

In the paper which I previously addressed to you on the subject of the antiquities within the limits of the Bhopal Agency, and which was published in the number of the Journal of the Asiatic Society for August, 1847, I mention (p. 761), that at Puthâree near Oodehpooर (between Saugor and Serouj), I had heard of the stone representation of the Boar Avatâr of Vishnu. My interest in the place was further roused by what I learnt verbally from Dr. Spilsbury and Lieutenant-Colonel Sleeman, and I was thus glad that I should have an opportunity of visiting the place in the course of the present cold season. I was at Puthâree towards the end of last month, and I found not only the image of a boar, but a series of antiquities possessed of some peculiar characteristics and highly deserving of accurate description and delineation.

Puthâree is said, according to local tradition, to have been anciently called Barnuggur, and to have been ruled over by one Muheeputch, who had seven hundred and fifty sons, in honour of each of whom he reared a separate temple to Mahâdeo, the remains of all of which may still, it is asserted, be found. Barnuggur is not an uncommon name, and is evidently a vernacular corruption of the more classical form of the word, *Varaha-nagara*. Muheeputch is evidently Muheeput, i. e. Mehput as now written or pronounced, and the present state of the ruins attest that at one time the temples must certainly have been numerous, if not so many as tradition represents. No date is assigned

to the Raja's reign, but the style of architecture seems to point to the early centuries of the Christian era.

The place is situated in the midst of isolated groups of low sandstone hills, and the locality includes two good sized reservoirs formed mainly by damming up the outlets of rainy season streams. The most important series of remains is to be found along the banks of the larger reservoir, while the present town and the smaller lake are distinguished by a single pillar and a solitary temple. Intermediately there are ruins of fanes of different kinds, with the fragments of various figures scattered about; and one of the isolated hills seems also to have been occupied by devotees, or by some of the members of the religious establishments of the place.

The Jain Temple on the larger reservoir.—On the western banks of the larger reservoir there is situated a Jain temple, perhaps comparatively modern. It forms a hollow quadrangle with sides of probably 120 feet in length, but its only peculiarity seems to be that the ranges of cloisters are surmounted by alternate pyramidal spires of the usual Indian kind, and domes of the common Mahometan outline. The sculptured figures are inferior, and the architecture of the building rude in the extreme.

The Brahmanical Temples on the larger reservoir.—On the northern bank of the larger reservoir there are several Brahmanical temples, two of which deserve notice. One, a simple shrine, Buddhist in shape, contains an elaborately sculptured representation of Vishnu as the Boar. The statue is about $4\frac{1}{2}$ feet high, it is covered with figures disposed in ranks; it has a diminutive woman hanging by the tusk of the God, and the remains of a serpent may be traced on the ground on which it is standing. It evidently illustrates the same religious sentiment, or train of ideas, as the corresponding figures at Ehrin and Oodehghir, described in my previous paper, (*Journal Asiatic Society of Bengal*, Aug. 1847, pp. 755 and 760.) The other temple is ruinous, but one chamber still contains detached figures showing Vishnu in the several forms in which he is supposed to have become successively manifest. During the hurried inspection which I made of these figures I noticed nothing differing materially from other types, and I neither saw nor could hear of any inscriptions. Both temples however appear to have been of the flat roofed Buddhist type, and not pyramidal.

The Temple called Gurrulmurm, on the larger reservoir.—The most remarkable of the monuments at Puthâree is the temple called “Gurrulmurm,” situated on the southern side of the larger reservoir, and the legend respecting which is as follows. A certain Gâdree or Gare-ree, i. e. a shepherd, tended the flocks of a Rishi named Gaianâth, and after many years of faithful servitude he was prompted by his wife to solicit a favor or reward. The Rishi filled the end of his blanket or plaid with barley and told him to be happy. The shepherd however disregarded the gift as valueless, and threw it away, or placed it to one side. His wife's curiosity could not be satisfied without seeing what had been received, nor would she believe that the saint would bestow any thing in vain. She searched, and her faith was rewarded by finding a heap of gold instead of a heap of corn. Her gratitude moved her to build and endow a temple, and hence, says the tradition, the name of Gurrulmurm, i. e. the “Muth” or temple of the “Garêun” or Shepherdess.

There are the traces of a square inclosure with sides of about 350 feet, and of a pillared entrance or gateway on the northern face. Within this there is a raised terrace forming a second inclosure of about 140 by 115 feet, with a second pillared gateway opposite the first leading on to the platform. The temple itself is in the centre, and it seems to form a kind of Greek cross of perhaps 30 feet by 27 in base, with the exception of the projecting portico or entrance, which has a depth of 24 feet. The temple is pyramidal, and it may be as much as 65 feet, in height. (Pl. XXVI. fig. 1.) Opposite the centre of three sides, and also opposite the four corners or re-entering angles of the cross, there are small flat-roofed temples at a distance of about 40 feet, or on the edge of the raised terrace. The centre of the fourth side is occupied by the entrance to the terrace itself, and the general plan of the whole is as given in the accompanying sketch.

The Gateway of the Gurrulmurm temple.—The outer gateway of all deserves no particular notice, but that leading up to the terrace at once strikes the observer as bearing a strong resemblance to the gateways of the Buddhist “Tope” at Sâtcheh near Bhilsa. There is indeed but one architrave instead of three, but the sculptures at Sâtcheh show such a gateway with two architraves only, and the existing entrance at Puthâree seems thus merely to give a further simplification of the

style. The gateway shows likewise an advance generally in the art of architecture; the lower pillars have subordinate capitals and bases formed of Vases filled with flowers, curving over the sides, and the shafts are made octagonal and are further adorned by bells suspended by ropes. The upper columns have each the aid of four "caryatid" women at the sides, and of four lions rampant at the corners, in upholding the architrave, as at Sâtcheh;—and further, as there, the ends of the architraves support couchant lions, between which there is also placed a central ornament. The upper portion however of the rectangular doorway or opening has been formed into a pointed arch of a more or less compound form, by the insertion of curved stones, which do not enter into the construction—that is, the arch is false, as are the archways of the fronts of Mahometan mosques, at least in design, and it would indeed almost seem as if the pointed arch of Mussulman architecture originated in an adaptation of the existing styles of the time of the Moghul invasions. The accompanying sketch (Pl. XXVI. fig. 2,) gives a tolerably accurate representation of the entrance, but the archway has been restored by guess, as fragments only of the curved stones are to be found. It has however been restored according to an existing example at Ghearispoor, which is *prima facie* architecturally Buddhist, and the re-entering angles of the double curve seem further to afford room for the projecting forelimbs of the lions. The immediate entrance of the temple seems only to deserve remark, as being composed of the same description of pillar upon pillar as in the terrace gateway, the lower pillars having however capitals of elephants' heads, and as having miniature stone screens on either side, which appear to be modifications of the stone railing of the Buddhist "Tope" at Sâtcheh. At the beautiful temple of Mahâdeo at Oodehpoor, previously described, there are similar lateral screens.

The detached fane's of the Gurrulmûr temple.—These shrines seem to have been formed to contain one image only, with a small pillared portico in front. Their external dimensions are about 12 feet by 9 in base, and 10 in height, excepting that to the rear, which may have been of two stories. They are flat-roofed. The door-posts are elaborately carved agreeably to the custom of the present day in many parts of India. These fanes are mostly ruinous, and the images have been broken or removed. In one the idol seems to have been Ganâsh, and in another there is a rectangular pedestal so formed as to allow the

water of oblations to run off by a projecting spout, but whether this pedestal sustained a representation of Mahadeo, or another God, is not apparent. The figures of the ornaments and the general style seem Buddhistic.

Outside of the Gurrulmukh temple.—In a niche in the rear, externally, of the temple and in niches on either side, are to be seen seated figures of Ganesh. Among the sculptures of the front may be noticed representations of Ganesh, and of the Fish and Boar Avatars of Vishnu, but there is also a figure of a seated Buddha, and another, of apparently the same manifestation, seated. There may be noticed combats between elephants, and also combats between men on foot and elephants, the former aided by horsemen. There is also a four-armed female figure mounted on a lion. On either side of the doorway there are groups of three female figures, succeeded by a four-armed God, which is sculpturally a modified Buddha. The limbs of this Deity are marked with the Sunk or Chukker.

Interior of the Gurrulmukh temple.—The interior walls of the temple are plain, and the pyramidal roof with its flat ceiling is in fact supported by four unadorned pillars. Opposite the doorway there appear to have been, first, an image of three feet basis, resembling that of Buddha in style, but which is now in fragments, and may have represented Gunesh, and secondly, a group about $6\frac{1}{2}$ feet by $4\frac{1}{2}$, and $2\frac{1}{2}$ feet over all, which is tolerably perfect. The group is in every way one of an unusual kind in India. It consists of a female figure about the size of life, recumbent on a couch with the left hand partly supporting her head and with a child lying by her side. The figure is artistically of fair workmanship and proportions, and is enveloped in a close fitting drapery which scarcely conceals the shape. Behind the couch there are five smaller female figures, standing, and apparently representing menial attendants. Two or more of these hold Chowrees, and one holds what seems to be a purse of money or a bag containing articles of utility. The couch is covered with a flowered cloth; it has cushions to help to raise the figure and it is supported by four carved legs, by two couchant lions and by a seated human image. Tradition declares the figure to be that of the Garerun who built the temple, and adds that the shepherd missing his wife one day was told that her heart's desire had been accomplished, a copious spring had overflowed and formed a lake close to her temple, and that she herself having done

with the world had been metamorphosed into stone and had become the guardian of the fane of her own erection. It is not clear what myth or what theogonic idea is represented by the group in question, especially when its importance with reference to the temple is considered. In addition to the figures above described there may be seen lying on the floor of the temple a small Lingam with a well proportioned female head carved in relief on one side. No inscriptions could be seen or heard of.

General conclusions with reference to Gurrulmukh temple.—The general impression left upon the mind by an examination of this temple, is that while it is religiously a bráhmanical edifice, it is architecturally and sculpturally an adaptation from Buddhism, and serves to show how old material forms are preserved amid mental changes and the revolutions of sentiment. The plan of the *Tope* is upon the whole readily traceable; the hemisphere is indeed stretched into a pyramid, and the four entrances with tutelary Buddhas are here represented by three exterior niches containing figures of Ganésh, and by the one interior image opposite the one entrance which every building must at least have. The temple is surrounded, as at the Buddhist Sátcheh (and as in the purely Saivic Oodehpoor,) by other smaller fanes, and the whole is inclosed by a wall with a regular entrance. In an artistic sense, the superiority over Sátcheh is greater in an architectural than in a sculptural point of view. Its architecture is much inferior to Oodehpoor, but both in a religious and artistic aspect it seems to stand half way between the “Tope” at Sátcheh and the perfect temple at Oodehpoor, or to show faith and skill dwelling upon old shapes while imbued with new ideas.

Bheem Sen's Guj or Luth.—Near to the western edge of the smaller lake stands the wand or pillar, now called of Bheem Sen. (Pl. XXVI. fig. 3.) It is composed of a single block about 36 feet in height and $2\frac{1}{2}$ thick. The shaft is square in section for a height of eight feet, and it then becomes circular. The capital consists of a grooved round disc surmounting a plain square one, and it originally seems to have sustained a group of figures, of which a portion only of one now remains. The capital is perhaps a modification, and if so, one for the better, of the capitals in existence, at Ehrin and Sátcheh, and the original shape of which, by the way, seems accurately preserved in the pillar at Bettiah near Benares, and in the remarkable columns still in existence near Caubul and Ghuznee. On one side of the square portion of the shaft there is a long inscrip-

tion much obliterated, and of which I failed to make even a tolerable impression. I had however two transcripts subsequently made partly by guess of the first two lines, which are sent herewith, and which may enable you to say whether it has been previously published.*

Temple of Siva.—Near to the column is a ruinous temple dedicated to Mahádeo, among the sculptures of which may be traced figures of Gunésh, and representations of the combats of animals, and apparently also of the worship of the Lingam.

Ghir Guj, or Mahádeo's temple.—Of the numerous ruins to be seen between the two lakes, there may be noticed a temple said to have consisted of seven diminutive stories, and to have been dedicated to Mahádeo. In a niche outside may be seen a figure of Ganésh seated. On the door-jambs of the temple, pilgrims or others have cut a few sentences, transcriptions of which are inclosed, and one of which contains the date of apparently 103 Sumbut. Near to the temple there is lying a colossal figure seated cross-legged, said to be of Bheem Sen, and which has a lofty flat topped ornamented head-dress such as may be observed in many Buddhist sculptures. Near to it again is another colossal figure also seated cross-legged, but with a natural covering of wooly hair on the head.

Kootkeswar Mahádeo's temple.—Another of the ruins is a temple termed of Kootkeswar Mahádeo, containing a figure of Siva with three heads and six arms, and a Lingam with a thousand representations of the symbol carved upon its superficies.

Temple of Siva on the hill.—Half way up one of the hills there is a cave in the sandstone rock, the front of which is partly blocked up with pillars and other fragments of a building not now further traceable. The cave contains a Lingam, with a well shaped human head carved on each of its four sides, so to speak. The fragmentary pillars have the subordinate capitals formed of vases with flowers falling over the sides, as elsewhere noticed, but the workmanship is superior to that exhibited in the other remains. On a separate stone may also be seen a symmetrical group of figures, the central portion being formed of a lotus flower displayed, supported after the manner of armorial bearings, by two birds. The birds are flanked by two elephants, and the elephants again are flanked by two sphynx-like figures, that is figures with human heads, and the bodies of animals.

* These are wholly unintelligible to our pandit.—EDS.

Temple of Jogheswar.—On the top of the hill there is a small temple dedicated to Jogheswar, which contains two groups of figures much mutilated. One group seems to have consisted of a central human idol with apparently a foot placed on the Boar Avatar of Vishnu. A lion has also fixed upon the hinder quarters of the Boar, while the head of the hog would further seem to have been cut off, were it not that the detached head lying in front of the Boar rather resembles that of a bull. In front of the Boar there is a small human figure kneeling, and seemingly on the defensive. The other group has a lion in the centre with perhaps a human figure behind, and with an unmistakeable bull's head lying at its feet. A woman is represented in front as if impaled, and another behind is shown as if falling from a height. The impression left on the mind is that the groups represent the triumph of the lion manifestation over Saivism and also its supercession of the Boar Avatar.

ADDENDUM.

Ghearispoor.—At Ghearispoor (described in the Journal of the Asiatic Society of Bengal for Aug. 1847, p. 756) on one of the beautiful architectural remains to be seen there, I observed two inscriptions, on a re-examination which I had not before noticed. Transcripts and impressions are forwarded herewith, one showing a date 1039 Sumbut (982 A. D.), as also the transcript of a third inscription, if a few letters may be so called, on the same building.

Oodehpoor.—At Oodehpoor (Journal Asiatic Society of Bengal, Aug. 1847, p. 757,) the industry of a man sent by Captain Ellis of Jhansee to copy inscriptions has succeeded in bringing to light one in good preservation on a detached stone lying near the town wall. A transcript is annexed, showing a date 1229 Sumbut (1172 A.D.)

Bhojpoor.—As the allusion made to the inscription on the pedestal of the Lingam on the temple to Siva on the edge of Raja Bhoj's lake now dry (Journal Asiatic Society of Bengal, Aug. 1847, p. 743), may mislead some into the belief that the inscription is contemporary with the building, I take this opportunity of saying that although really at first disposed to regard it as coeval, I am now satisfied after another inspection, that it is not so. The date however of the inscription does not affect the argument advanced in connection with "Achintea Deo," or the sign of the incomprehensible.

Camp vid Sekore, Bhopal, February 14, 1848.

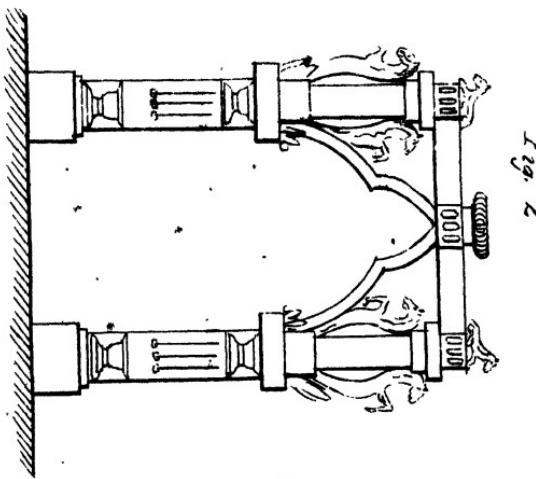
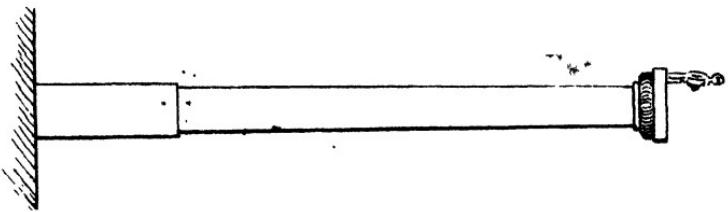


Fig. 2

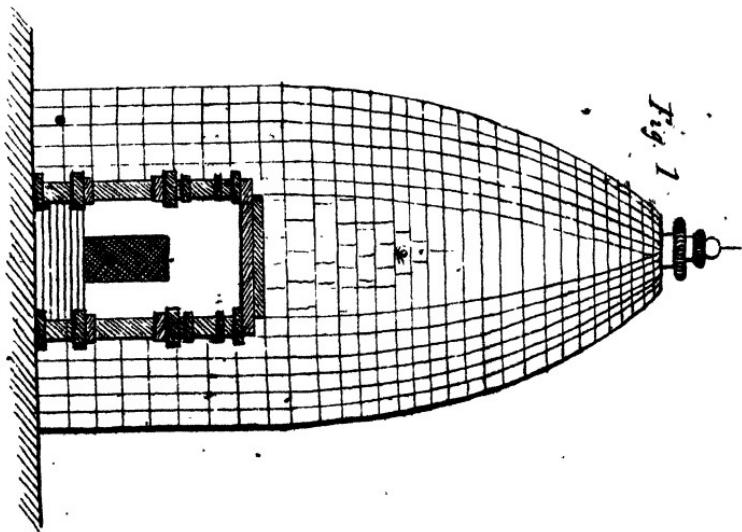


Fig. 1

Appendix to Lieut. MAISEY's Account of the Antiquities of Kálinjar.

We have now the satisfaction of completing Lieut. Maisey's admirable account of Kalinjar, by publishing the Sanscrit inscriptions, with a translation of so much of them as was intelligible, prepared by Bébu Sárodáprasád Chakravartí, and have only to regret their very insignificant historical value. We must not omit to acknowledge the very great assistance afforded by the careful transcripts made by Capt. Kittoe from the original fac-simile impressions.

No. 1.

नमः शिवाय। तत्पूर्वे नीविनोक्ते अवगुप्तवलयेनाशु निर्बाप्य हीपं
चूडाचञ्जप्रकाशप्रसरविधुरवा शैलभर्तुर्दुहिता ॥ भान्तभान्ता भजन्ता
नवघनपटलाश्वामलं वरटकाएँ दत्तासेषप्रमोदः प्रगुणयतु मुदं लेकुरा-
मीश्वरो वः । १। देहार्जानञ्जकान्ताकुचकुसुममयो भालनेचानलार्दि-
पीनोक्ता मौखिखेलमुखरसुरनदीनीरम्भो जगन्ति । स्फीसोत्तंसेन्तु-
कान्तिर्दिरददतिव्याक्षादनव्यक्तशीतः शंभूषास्थिकुन्दप्रकरपरिवृतः
पातु सर्वर्तु मूर्त्तिः । २। देवे द्यूतजितं प्रयाचति पर्णं देवी दिश्चतुर्तरं
न खामीति निगद्य कल्पितरूपः आन्ताः खकान्तासखीः । हारभान्ति ह-
ठावश्चष्टपणम्भत्पूलारदूरद्रुताः प्रेक्षालोकसमाधिभेदि हसितं कुर्व-
न्तरःपातु वः । ३। दास्येऽहं परिरम्भानि कितवद्युते जितानि तथा
मिथ्यौत्सुक्यनिदं यतः इतमहोरात्राणि तत्रावधिः । इत्युक्ताः शिवया
निश्चादिवसद्वज्योतिर्मयाद्विद्यनागुमेषनिमेषकोटिपटलव्ययो हरः
पातु वः । ४। चिन्तयत्वगुदिनं धानापदेशादयं येनामुं मुनयोप्यना
दिनिधनं ध्यायन्ति धौतस्युहाः । इत्यात्मकरे हते गिरिजया या तच
पद्मासना । येतत्कालातटकर टिष्ठोत्तत्त्वत्तिप्रसानप्रबग्नप्रच्छदाच्चः
कपटमृगपतिस्फादवर्भोत्तवेष मीर्वाद्याहृष्टचण्डप्रचयति काःकाञ्जि
कायाः अश्चद्यूतवलमुक्तसत्तनुतुषाकोटिज्ञिप्रस्फुरत्तारागुरुमतुर्क्षक्ष-
गमक्षिज्योतिर्ष्टेन्द्रायुधं । भीमभमविततजटादद्वच्छाभिवातच्छुभ्यहि

कुंभिकण्ठविनितविरचितोत्तालगीतप्रकाराः। पादप्रान्तप्रहारप्रचलित-
 वसुधागोल त्पदार्थं अतिकरदलिते भूतले भङ्गदुर्शं संप्राप्ते दिव्यपतीनां
 भुजवनपवनेऽप्सिते सत्त्वशून्यं। खस्तसर्गपगार्भेभवति ज्वालमाला-
 क्षिवक्षिक्षुष्टब्रह्माण्डभाण्डवविकटजटापिङ्गलिङ्गःपुरार्देः। व्याघ्राङ्ग-
 इरतु भवभयं ताण्डवाढ्वरं वः पादान्तर्लक्षणेखानिभृतवसुमतीचक्ष-
 वालप्रतिष्ठं नष्टाद्याशाविभागप्रसरमुखभुजाजाललीलायितेन वपुर्वः
 प्रजयमहमहाभैरवं भैरवस्य इन्दुर्ज्जरिताः कपालकुहरकोडे कुङ्ग
 वारिणःप्रोङ्गताःपगमण्डले फणिपतेरायामिभिः पूर्वतिष्ठता चेन्दवः
 श्वेतालाण्डवलालसालिचलितावद्वासरि चूडादृष्टपद्मगम-
 तिश्वासानिकापूरुग्णेग्ञन्ती तिमिरप्रसार द्वुभास्त्रामुखचक्षं
 निनदःप्रवातिविरचिताद्यापिसङ्गामिव ज्वातस्यानङ्गश्चोऽदरदमरधु-
 नीवीचिभिर्मैलिलोलाः कण्ड दत्तिदम्बिभुवनहविधाहन्तु
 होमलमो नः स्वप्नायोमानभागःक्षयसमय जविवंडपिण्डे च-
 खीभर्तुर्बुद्धोःकवलकवलनापूर्वजिङ्गाविलासाः ज्वालापालन पूर्व
 कामकोडितानि परमितरथासलिताविलक्षोदैषज्ञं वः चिं-
 गोतु कुमुच्युतयुधिवसुधावातसप्रीत करजां वस
 दाभूषिताः पान्तुखानवनीरदच्छविमुचश्रीकंठकंठाश्वः दोर्देँड
 वलयेहर्वनिष्ठंदिव्योभद्रचन्द्रार्धमौलेः प्रगुणायतु परब्रह्मलमः समाधिः
 परिचयं यं विपाकेन मूर्च्यं निश्चिन्नीश्वराङ्गेऽप्यनयतु स वः शाश्वतं
 मोदमीषः प्राणति सर्वेसुराः किं चामु रजनीषु राहरसुरःस्वैरं
 समाक्रामति पेस्यफिरदी शाकंशून्यपदेनिरस्यति यमुच
 तिश्चिप्यत्थभूधिशुक्तिसंपुटकुटीकोडे तथाच्यं मुङ्गः देवस्यास्य मुखाम्-
 जयुतिलब्रग्र भुविवांछया सरसिजश्रीभिरन्तर्जलं तलांठाव-
 धिमधपीनतगुभिस्तीब्रं तपस्ताप्ते ज्वालाकुंञ्जरकुंभसंनिधिमिलतपैष्ठप्र
 तापानं साक्षी विरोधिरान तद्वितम्। यः पीता मधुपर्कमुञ्ज्जलयशः
 प्रवर्थिष्ठश्चीभुजां निःप्रत्यॄहमहोकरयहविधिं चक्रे वृपाणां वरः। के

चिह्नाः सहेति निजभवनगता मोचिताः केऽपि केचिद्देशार्थे इत्यादाति
 क्षमाभिवर्गमिताः केऽपि नीता प्रमोदं वालापत्ताच्च कैचित् प्रतिपददय-
 या प्राणवप्राणयोद्धाः चौबीनाथस्य वस्त्रोमत्तमुज्जयिदेनारथः सारथस्य।
 दाढोपक्षं निमुम्बल्पदि विकर्षन् कुन्तलं कुन्तकीनामाधुम्बङ्गनारीकुच-
 काश्चलसचारधीराम्बराणि । खेतकान्तामजलकाञ्चिकादूषयक्षीक-
 यैव देवः क्रोडग्रीवासे मण्यमरुदिव श्रीद्वार्णाधिनाथः । मेदिन्यां विष-
 मेषुरित्वनुदिनं इद्वारवीरत्राचार्यः श्रीपरमदिदेवत्यपतिः कैर्नाम न
 स्तूयते । श्वायां चरणाङ्गे च पतिताः कामिन्यस्य विरोधिनस्य इतश्चे
 येनामुना खंडिताः । आकाशं प्रसर प्रसर्यत दिशस्त्वं पृथ्वी पृथ्वी भव
 प्रत्यक्षीकृतमादिराजयशसां युज्ञाभिवृष्टमितं प्रेक्षाच्च परमदिपार्थिव-
 यश्चादाशेविकाश्चादयादीजोच्छासविदीर्णदाढिमिव ब्रह्माक्षमादेष्व-
 ति । चिन्तामणिर्यदि शिळा न किलाभविष्यन्मन्ये न चेत्यशुरसां वैपि
 कामधेनुः । वक्षो दलिष्ठदुभयोरपि लक्ष्याक्षिन्याक्षाधिकं वितरति
 इविग्नं न देशे । निसर्गभक्त्या विदधे यरमदिनरेत्वरः सो उद्यमेतां निर-
 खारिः पुरारि चरणस्तुतिम् । दक्षिणातो मम गुणायह्यं न कार्यमा-
 र्याः कदाचिदपि दोषपदेभवद्धिः । द्वात्यं तदेव पुनरत्र विचिन्ततनु
 येनैव संभवति चेतसि वःप्रतीतिः । वीरश्रीपरमदिपार्थिवपतेरस्य
 प्रसादैकभूपैत्रः सहुश्चित्पिनोऽन्यस्तः पद्माभि धानः सुधीः देजकेन
 सहानुजेन तिष्ठतः शिखप्रक्रियाशालिनामाचित्य स्वयमुक्तिं खं गिरि-
 जामर्तुः प्रशस्तिं द्वातो । अचरमचरमादियाजवद्वोजलधीमिकादुम-
 यहारं धारयन्त्यम्बरान्तम् । फणिपतिफणश्वाशायिनी यावदुद्वीक्षिति-
 रिह परमदिप्यापतेलावदस्तु । संवत् १२६८ कर्त्तिक शुद्धि १० कोर्मे
 मङ्गलसंमहाश्चीः ।

The first twenty-four lines of this inscription are of no historical importance, consisting of a eulogistic address to Siva and Parvati, conceived in terms somewhat too glowing for the pages of the Journal, and are omitted accordingly.

25. "He the greatest of Kings, having drunk, like draughts of honey and curds, the shining fame of the kings his enemies, introduced a rule for collecting the land revenue without resistance from any foe (or he became the husband of the earth, which without resistance completed the ceremony of marriage)."

26. "Some having been easily made prisoners and kept in his own house, were afterwards released. In a moment he caused some of them to wander from house to house ; some he made to enjoy happiness; some, the fathers of little children, with unceasing compassion for them, were seeking safety for their life within the walls (of some castle). Of the long arm of this king his enemies were afraid as of their *fatal* enemy."

27. "The King of Dasharna like the wind of the Malaya mountain, kisses sportively the lips of the maidens red like the pomegranate, seizes them by their beautiful tresses, removes the garments that shine brightly on the high bosoms of the maidens, and easily dries the perspiration occasioned by sport from the brows of the fair."

28. "By whom was not the king Paramardí Déva esteemed ? He was as the god with the uneven arrows* upon earth, like a spiritual guide in the mysteries of love. Hundreds of maidens who approached his bed, and hundreds of foes who fell at his feet, were rejected by him.

Thou firmament move on, and ye quarters of the world, proceed ; and thou earth enlarge ! ye who have witnessed the wide spread fame of former Kings, now behold the rising glory of the fame of King Paramardí, which like a pomegranate bursting by the swelling of its seeds, extends over the world. Seeing the gifts of this King, who gives even more than is requested, the hearts of the Divine jewel (Vishnu's Chintamoni,) and the heavenly cow (Kama-dhenu, who grants all wishes) would have burst with shame if the former were not a stone, and the latter an animal.

The King Paramardí having conquered his enemies, himself composed with his innate faith this eulogy of Purári (Siva).

Oh ye venerable ones ! although my liberality is great, still my high qualities will not be remembered by vicious persons ; meditate therefore on such works as may satisfy your minds.

* Káma, the number of his arrows being five. Another meaning of this passage is : He was unparalleled by his arrows. Both meanings, this and the other in text, must be kept in view for the understanding of the passage.

"The able Padma, the favorite of the valiant King Paramardí, the grandson of an eminent artist, the son of Anrina, and superior to all artists, has in company with Déoka, his younger brother, composed and inscribed this praise of the husband of Girijá :—

"As long as the earth, clad in the garment of the atmosphere, which is adorned with the garland of stars joining, like two resplendent breasts, the eastern and western mountains; as long as the earth rests upon the bed of the hood of the serpent-king, so long let this work of the king Paramardí endure. Dated Monday the 10th of Kartika, Sudi Samvat 1298. May prosperity and success attend!"

No. 2.

- १ श्री नमः शिवाय । अनुसरति सरोवे पादिजाताय तस्मिन् सपदि
किल यथार्था दीदसी संबभूव ।
- २ कोऽपरः श्रीपरः १ भूपेऽस्मिन्बद विन्न रौजविजितं किंतश्चितं
नो पराम् द्येभ्युयतवन्युमा निववि ।
- ३ भुजान्तरेऽपि यस्त्रिक्षीड किंतश्चाम् ४ अद्यासाहितद्विष्टुष्टविल-
सत्यं सारदक्षिण्या यो
- ४ विदतिप्रसिद्धमहिमाभूमीधरे भूसुरः ५ गारायणो दृक्षवतां वि-
हाय मोदाकुलाताव
क्षिर्दीतीयस्य सुतोयशोगः भुवं भारात्यशेभिरासीदेलाधरोदद
गत
- ६ दाभिरन्ययमदन्तमनोकरेणुः १२ तस्मिन्निन्दामनार्जस्थितिमनुवद-
ति चोणिपाते
- ७० जित् अग्नि विजयपालस्तुतो भूमिपातः श्रिततरतरवालञ्ज्वल-
दाग्न्यमातः
- ८ खनुः कुम्भोद्धवाभो नमितावनीभृत् यो दक्षिणाश्राभरणीष्ठतात्मा
कर्णार्णवं तूर्णमपा
- ९ अकार १६ मालवाधिपकुरञ्जोचनाशोचनाम्बुनिवहेन सिक्षया
मख्योग्नतश्चिर

- १० स्यद्गुर्जवर्मदेवः प्रयोतनारायणपादसेवः सखीकर्पर्वतधिगम्य
पूर्णान्वच्छाद
- ११ वर्मगि निधाय भारं भुवः परिआन्तः अवगाहितुं प्रपेदे स व्य-
क्तिदशापगानीरम् २५
- १२ मुक्तजीवाच्चे परस्मिक्षश्यमाप्नुवन् ३८ तदनु मदनवर्मा भूमिभारं
वभार द्विपग
- १३ गाढ़ मुखमभिवदनं प्राप्य द्व्युक्तगन्दीच्छन्दोपान्तेयपेदेतरजयम-
भि व्यस्य रक्षोभवन्य;
- १४ मुनाशोथतगुर्जरेशः क्षणेन क्षणेन पुरेव कंसः १३ नेता दिग्जयकौ
तुक्षयसि
- १५ शश्वत्खलु कोर्त्तिमालम् ३५ आतां कनीयान् मदनस्य राज्ञः प्रताप-
वर्माभवदुत्प्रतापः
- १६ सञ्चुर्य क्वापि लीनं विकलानतिक्षाणं नष्टगर्वादविष्टं दग्धां सन्ताप-
युक्तं निर
- १७ नां ओतुं स यावदिगुणास्य चक्षुः। प्रभुर्लसद्वीरगुणो नरेपोन्यस्यदा-
सा तिविरिच्छिनायु
- १८ म्यनीनयनयोक्तापं दिवम्भागसे जात्यं तदिमुखामाजिषुकमला-
वराच्छाम्भ
- १९ संसर्गलीलायितम् ४५ शूद्रोयं ननु किंकलानिधिरसौ प्रबद्धमु-
दीक्ष्य तेजातावन्दन
- २० कलकालिगरुम् ४७ सकलपदवाहेयुगजरथदलनसमवनसरसकाश
- २१ नगरं यस्य विश्वं विजेतुः समरविजयकोर्त्तिक्षम्भरुपोर्जुनोऽभूति-
चि दुग्निमह
- २२ दिङ्गा सकलसुमनसां मानसं व्यानश्चेयः कामं वामः स सर्वेन्द्रश-
मय मनयद्वीरवर्मा
- २३ तापाघनेविटपकुटोसङ्गाटेसङ्गिक्षाणं जैवेवाचातु यस्मिंश्चलति नव-
लजिष्माम

- २४ चोम्बरं नानापत्ररथाभिसाकुलकाल्याहारहस्ताभगं कौमारं स-
पुरांश्च
- २५ हाप्रस्तुतादेवाखयोद्यानतडागवापीः सकारथामास चतुर्चतुर्च ५६
सेवा
- २६ माधवुर्विदुपाश्चयोदमदितोवयः खर्णसुलावितीर्णा सहस्रशो मेरम-
- २७ यो नीषकगढं कमलां च कालों च वीविश्वस्तद्वासु घोभनेषु यज्ञे
श्रौत नयने
- २८ सार्वं एधुश्चीः यच्चैतानि स्फुरन्तिप्रस्तुतमरप्तयुत
- २९ दुर्दाह नां आन्ताषूर्वं तदनुपदमिषत्तारतम्यक्रमेया
- ३० बुखस्थाने यो वृपो श्लै प्रशस्तिर्वक्षकोवीरनामस्त्वमुदे
- ३१ प्रदा ७१ भास्तो ५ मुपाख्याति

The meaning of the first six lines is ambiguous.

7. "Was born Bijayapála. From him sprang Bhúmipála, who with his sharp sword destroyed many kings.

8. His son made low the kings, as Agastya made low the mountain (the Vindhya mountain). Having conquered the southern country, speedily defeated the immense army of Karna.*

9. * * * * which was watered by the flood of tears of the gazelle-eyed females of the king of Málwa. * * *

10. "His son, Jaya Varma Déva, who was devoted to the worship of Nárayana (unintelligible).

11. Being wearied of Government the king made it over to * * Varma, and proceeded to wash away his sins to the divine river * *

12. They departed their lives and obtained all their desires in the next world.

13. "After him Madana Varma assumed the reins of Government * * * (unintelligible).

14. He in an instant defeated the King of Gurjara, as Krishna in former times defeated Kansha. He undertook an expedition to conquer the world * * * *

* This sloka contains a double meaning. The word *avambrit* is susceptible of two interpretation; the one "Raja," referring to the word son, and the other 'mountain,' in connection with *Agastya*.

15. The younger brother of king Madana was Pratápa Varma, who was most powerful.

16. He was concerned for those * * * * * * * * * who were lame and weak; * * * * * * * * * who were sick, and who were distressed.

17. * * * He had double mouths and double eyes (?) He the Lord, ever endowed with the eminent qualities of a hero. (The rest unintelligible and obliterated.)

18. He made the eyes of the women of * * warm (with passion) and confounded the hearts of his enemies.* * Kamalá (Lakshmi) who was against * * in the field of battle. * *

19. * * he looks as a hero * * (unintelligible.)

20. * * (unintelligible.) * *

21. * * (unintelligible.)

22. * * He who delighted the hearts of all the learned Vira Varma, disdaining pleasure, subduing all his desires.

23. * * (unintelligible.)

24. * * (unintelligible.)

25. * * he caused various temples, gardens, ponds and tanks to be made at places. * *

26. * * who was a patron of archers * * * who like thousands of Sumeru, bestowed gold in Tula. * * *

27. Who established the images of Siva, Kamalá, and Kalí in splendid houses * * *

28. * * (unintelligible.)

29. * * * they being tired followed his steps in the order of their ranks. This eulogy was * * * by a person named Vallukí Vira.

No. 3.

दोषहीर्दयचण्डाहतिथसनमिषाहीमनक्षत्रजात्म मुक्ताहृदास्यकारं
वज्जवितसजटे ताखवे चण्डवैरी सर्वेभ्यः सोऽस्तु नित्यं भुजगपरिकरः श-
श्वरः सद्गुत्तम्योः आसीत्पूतिः श्रुतीनां नयविनयनिधीर्धाम वै यो द्युती-
नां राजसहशः सर्वशास्त्रार्थवेदी प्राप्तो यो योगसिद्धिं कलमभयदं
प्रसविष्णानवक्ता सदृक्षोऽपि प्रतापी रविरिव सुजनाम्भोजसंघप्रमोदी
दानी दीर्घाकृत्यो यः प्रमात्म जनस्य। सस्य यज्ञो जटिलधीर्व्यश्चारमहा-

गुरुः देवा करोनवा लोहीवा सच्चन्नमखितजटामुकुठामरेष्याम् अपि
 चाचालि पतचिखः विभान्ति चिचाजयपरे सरसुन्दरीशां गीतैलिको-
 चतनमखृतितो न भग्नः श्रोब बराभिरामा कुरुते वीरधार्मार्थ
 कारैः वीरायचानुविज्ञेष्वनिभि अग्नितभयं श्रुतार्था
 सभोगविमुखोऽखिलवेद्यवेदी प्राज्याभ्यहोमविधि ये भाति इ-
 अभुजि पुण्यशक्तिः प्रथयतिन यमः इश्वरोऽस्य प्रभावैर्विस्ताते विश्वमथ्ये
 मुख्यार्थावार्थनाय चाच गुणीकरणङ्गं इक्षोभृगूच विस्ताति
 काल्याम् मोजविषेतत्खण्डितभयभयं ते ब्राह्मणेभ्यो
 गुरुष्टो वयाति सर्वशोनिष्ठितं वा

Of this inscription very little is intelligible.

" May Sankara, by whose dancing the curls of his matted hair were dishevelled, and the shining stars, struck by his uplifted arms, were agitated ; whose laughter surpasses the beauty of pearls ; the enemy of Chanda ; and whose person is adorned with snakes as a sacred thread, * * * may he belong to us every day !

" There was a Rája the source of the Védas, the place of morality, modesty, the dwelling of renown * * * well versed in all the Shaastras ; who became a perfect yogi and hence attained the undisturbed fruit of Brahma, and who was the speaker of divine knowledge, and who though powerful was yet gentle, and like the sun the lotus, delighted good persons ; who was a donor and extremely kind, and an example to the human race."

" His son was Jatiladhi, whose principle was to gain the affection of others : though he was Doshákara, (the mine of guilt,) yet he was not unclean (or though he was Doshakara, the maker of light, i. e. the moon, yet he was without spot.)

(The rest unintelligible with exception of unconnected sentences.)

No. 4.

स्त्रियरसभद्वारकमहाराजाधिराजपरमेश्वरपदमस्त्रेश्वरशीका
 लभ्यराजिपतिशीमभद्रनवमैदेवपादाम्बूजाराधिकातत्पदे धीमान् धर्म
 परावदो महाराजपुत्रशीकोलुकुसुतमहा साइसिकेन हुःशैकेन कुमर

कुमारमणेन्द्रमहाराजपुत्रश्रीवर्षराजः देवश्च नित्यविद्यैकसच्छेष्ट-
सदुपास्मेऽयदानः देवश्रीनीलकण्ठस्य मूर्तिकरः श्रीरामसुतरूपकारः
श्रीसाहाय्याववद्वानरूपकरश्रीलः श्रीवरदायामूर्तिरेवाकारायितेति
संवत् ११८८ कार्तिक सुदि ६ शनै

The welfare to Raja Deva, son of the great king by name Kama-lénda, born in the Kumara family, was excellent in divine knowledge, a liberal donor, the worshipper of the lotus foot of Madana Varma Deva, the learned, the king of kings, most wealthy and a great devotee of Mahéswara (Siva), and king of Kálinjara; in concert with the very valiant son of Soluna, the son of the great king, caused this image of Varadá to be made of stone by the same sculptor, the son of Sri Ráma, who made the image of Nilkantha, and who by his innate talent was able to form an exact likeness. Samvat 1188, Saturday the 6th Kartik, Sudí.

No. 5.

दीक्षितश्रीष्टश्रीधरसुतः सर्कारश्रीकल्हणोपाभृतस्य तनयेन स-
क्तारश्रीठसिंहेन देवश्रीठसिंहस्य मूर्तिरियं कारयितेति संवत् ११९२
ज्येष्ठ वदि ६ रवौ

This image of Nrisingha Deva was caused to be made by Sarkkára* Nrisingha, son of Sarkkára Kulhana Prabhrita,† the son of Díkshita,‡ Príthwidethara.—Samvat 1192 Sunday the 9th Jaist Vadi.

This image of Nrisingha was made by Nrisingha, son of Kalhana, the son of Díkshita Príthwidhara.

No. 7.

महेश्वरकञ्जप्रनामुदितप्रति नारायणकादमनकाञ्चभयकनितुप्रति संवत्
१५६७ समय आवाढ सुदी इहजकञ्जं लिखते

* Perhaps a title, such as Sircar, &c.

† Name of a line.

‡ The word Díkshita means one who received the initiatory incantation.

*Daily I salute Mohesha, and both Narayanaka and Domanaka.—Samvat 1597, time Asharha Sudí, written by Duyija.

No. 10.

मलिकार्जुनकड़प्रनामु अभरनगणकानाथवावुवकरमकनिश्चति
संवत् १६००

Salutation to Malika Arjunat * * * * .—Samvat 1600.

No. 11.

पंडवफेरिथपेसरकारनवाव अबदुलहस्ता संवत् १६६७ चैतसदी
पांचै मंगलु लिखितं रामदास तरफदार गोसाईदाससुत पंडवनकहे
प्रनामु

‡ This was written in the Samvat year 1667, on Tuesday the fifth Sudí of Chait, during the reign of Nawab Abdool Khan, by Ramdas Tarafdar, son of Gosain Doss. Salutation to Pandanona.

No. 12.

पीताम्बरे गणपताष्पिनिष्ठकरांशे कालज्ञरेवसतुमध्यगुह्येतुगुरुं आव्रे-
श्वरे प्रथितनामि च पुण्डरीके धर्मेश्वरेसभिधभोगिसहस्रालिङ्गे योग्ना-
क्तिके दलितसायनभावितेज्ञाधातैष श्रैषमयश्चैवगृहाणि मुक्तै विष्वसि
तानि सदनानिमुनवानि सोयं वसन्तहरनन्दगताण्डवाय

There are in the solitary valley of Kalinjara, which is free from rents, the images of Pitámvara (Vishnu); Ganapati, Pandareka (Vishnu), which is well known by the name of Byaghreswara§ and of Sahasralinga (Indra). He who subdued the Atheists had for his salvation erected these temples of Siva, which were made of stones. Besides this for the dancing of the son of Vasantahara, he also repaired all the destroyed temples as newly erected.

* These Inscriptions are not in Sanscrit language, but in rough Hindi, or in some language of the hilly tribe mixed with Hindi.

† The rest is not intelligible.

‡ पंडवफेरिथपे ! The meaning of these foregoing letters is I presume nothing else than the name of a place, *Pandavoferithopa*.

§ Here the words स्त्रिय भोगि have no perspicuous meaning.

MISCELLANEOUS.

What to observe on the Himalayas.

The following instructions what to observe on the Himalaya were given by Baron Von Humboldt to Dr. Hooker, and have been kindly communicated to us by the latter gentleman.

Hauteurs auxquelles cessent de certaines familles de plantes.

Le caractère de la Flore Sibérienne : est il, vers Cashemir et Ladak, si général qu'on le prétend ?

Jusqu' à quelle hauteur y-a-t-il des poissons dans les lacs ? Comparer les espèces et les rapporter.

Etre bien attentif à la température du sol à différentes hauteurs.

Se servir de sondes à cet effet, comparer les températures du sol entre les tropiques de 18 pouces à 2 pieds de profondeur (Boussingault) avec la profondeur de 20 ou 30 pieds plus au Nord.

Eclaircir le problème de la hauteur des neiges perpétuelles à la pente méridionale et à la pente septentrionale de l'Himalayah, en vous rappelant les données que j'ai réunies dans le troisième vol. de mon Asie Centrale.

Je ne puis croire à l'uniformité et à l'ennui des Gneiss, Micaschistes, ou formations Siluriennes de l'Himalayah.

Faire plus d'attention aux formations Porphyriques, au Grünstein, aux Amygdaloïdes (?) aux Basaltes (?) de la chaîne.

Si l'on est assez heureux de traverser la grande Cordillère de Kouen-lun pour arriver à Yarkand, en remontant vers les sources du Chajouh, affluent de l'Indus, être bien attentif au peu de hauteur de la plaine qui envoie les eaux à l'est, par le Tarem au Lac Lop.

Des hauteurs barométriques, ou, s'il le faut absolument, des degrés d'eau bouillante, seroient bien précieuses à déterminer dans la plaine à l'est de Yarkand.

Variations horaires du Baromètre dans les plateaux et dans l'Himalayah même.

Observations psychométriques, pour en comparer les résultats avec l'énorme sécheresse que j'ai éprouvée dans les steppes de Sibérie.

Températures des sources, des cavernes.

Les Insectes vont-ils moins haut que les plantes ?

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR APRIL, 1848.

The usual monthly meeting was held on the evening of Wednesday, the 5th of April.

J. W. COLVILE, Esq. President, in the chair.

Dr. Falconer, with reference to the publication of the March number of the Society's Journal, on the day of the April meeting, and the consequent appearance of the Proceedings for March prior to the confirmation of the minutes by the April meeting, adverted to this as an irregularity, and complained of the Report being incorrect in its account of the part he took in the discussion at the March meeting. Dr. Falconer also renewed his objection to the irregularity which he considered had taken place in the last election of an Honorary member.

The President replied, that the publication of the Proceedings was authorized by the rule adopted by the Annual Meeting of February from the last Annual Report. As to any error in the Report he was certain it would be at once corrected when pointed out.

The accounts and vouchers for March were submitted.

The following gentlemen having been regularly proposed and seconded at the March meeting, were ballotted for and duly elected :—

C. Gubbins, Esq. C. S.

Lieut. R. McLagan, Bengal Engineers.

Raja Ramchand Singh.

Babu Ramaprasad Roy.

Read notes from—

Lieut. Baird Smith, B. E. and R. Thwaytes, Esq. withdrawing from the Society.

The following gentlemen were named for ballot at the May meeting:—

Dr. Adam Bell, Surgeon to the Governor General, proposed by the Lord Bishop, and seconded by Dr. O'Shaughnessy.

James Corcoran, Esq. Urdu Translator to the Sudder Dewany Adawlut—proposed by Dr. O'Shaughnessy, seconded by Mr. H. M. Elliot.

Andrew Hay, Esq.—proposed by Capt. Douglas, seconded by Mr. Laidlay.

Lieut. H. C. James, 32d N. I.—proposed by Mr. Laidlay, seconded by Capt. Thuillier.

Capt. Champneys, Deputy Auditor General, proposed by Mr. Blyth, seconded by H. Alexander, Esq.

Col. Hearsay, 10th Bengal Cavalry—proposed by Mr. Blyth, seconded by Mr. Frith.

Read letters from H. M. Elliot, Esq. Secretary to the Government of India, Foreign Department, requesting the immediate return of Lieut. Stack's Grammar of the Sindhi language, as that officer is desirous of superintending its publication at Bombay.

From H. M. Elliot, Esq. transmitting for publication by direction of the Governor General in Council, a second Report from Lieut. Keatinge, on the navigation of the Nerbudda between Hindia and the Falls of Dharee. (Ordered for publication.)

From J. Thornton, Esq. Secy. to Government N. W. Provinces, forwarding a duplicate of the same paper, and requesting to be supplied with 100 printed copies for distribution.

From H. M. Elliot, Esq. transmitting for publication by desire of the Governor General in Council, a Report (in original) on the Kohistan of the Jhullunder Dōab, by Lieut. Parish, of the Artillery. (Ordered for publication.)

From H. M. Elliot, Esq. transmitting a letter from Mr. John Lawrence, with enclosure and drawings by Lieut. Herbert, 18th N. I., of Ariano-Pali fragments found by Major Lawrence in the Yusafsyé country. (Ordered for publication.)

From Capt. H. L. Thuillier, Officiating Deputy Surveyor General, communicating a Tabular monthly statement of the fall of rain; and of remarkable gales—hurricanes and thunder-storms, experienced in Calcutta for the 19 years, ending December, 1847.

From Capt. James Abbott, Boundary Commissioner, Punjab, dated Camp near Jumboo, 6th March, 1848, sending an account of the process employed at Koteli for the manufacture of the Damask Matchlock Barrels. (Ordered for publication.)

From Dr. Campbell, Darjeeling, forwarding his Itinerary of the route from Phari in Thibet, to Lassa, with notes by Mr. Hodgson. (Ordered for publication.)

From Major Madden, Bengal Artillery, Almorali, forwarding his account of the Turae and outer mountains of Kumaon. (Ordered for publication.)

From B. H. Hodgson, Esq. Darjeeling, returning by dak banghy, Humbold's Asie Centrale and Pemberton's Report of Bootan, lent Mr. II. by the Society.

From Lord Arthur Hay, presenting to the Society the last edition of Wilson's American Ornithology, and 188 original drawings of Indian birds and insects, prepared under his Lordship's superintendence.

The special thanks of the Society were unanimously voted to Lord Arthur Hay, and personally expressed to his Lordship by the President.

From John C. Erskine, Esq. Judge of the Cis-Sutlidge states, enquiring regarding a History in Sanscrit by the Pundit Jowahir Lal, with a map of the place of Pilgrimage called "Kuruk-Kshetra."

The Secretary stated that the Map has been found, and that the MS. is supposed to be in the possession of the Rev. Dr. Hæberlin of Dacca, who has been referred to on the subject.

From Babu Ramgopal Ghose, with reference to the alleged discovery of certain Sanscrit works mentioned by Capt. Cunningham in his official correspondence, but which Babu Ramgopal finds are all procurable in Calcutta. (Referred to Oriental Section.)

On the "Oology of India," a description of the eggs and nests of several birds of the plains of India, collected chiefly during 1845-46; by Capt. R. Tickell. (Ordered for publication.)

From Capt. Kittoe, forwarding a proof copy of three inscriptions he has had printed in Modern Nagree, and translated in the Vernacular, for circulation in the Benares district; also transcript of Col. Ouseley's inscription from Punjur, and a coloured impression of the famous medal in the possession of Ram Row Thakea at Benares.

The medal is of the purest gold, weighing 100 sicca weight, copied from one of Alumgheer.

Views of the Benares College, now erecting by Capt. Kittoe, were also exhibited to the meeting.

On the Liquidamber tree of Tenasserim, by the Rev. F. Mason, late of Moulmain. (Ordered for publication.)

From Dr. Roer, conveying the Report of the Oriental Section on several references made to it by the last meeting.

To the Senior Secretary, Asiatic Society of Bengal.

SIR,—In answer to your letter of the 29th ult., I have the honour to convey to you, for the information of the Council, the opinion of the Section respecting the subjects submitted to their consideration.

2. The Section beg to suggest, that of the Tazkiras of the Persian, Hindí and Urdú poets, as many should be purchased as the funds of the Society will admit, and that Mr. Hall be requested to make the selection.

3. As to the rite of Antarjala, I have annexed some passages of the Puráñas, bearing on the subject, which clearly prove, that the rite is well established, but limited to places near the banks of the Ganges. It is also mentioned and sanctioned in the Navya Smriti. This rite is, however, of comparatively modern date, as no allusion is made to it either in the Védas, or in the Itihasas, or in Manu.

4. With regard to the work of the Prince Gholaum, the section have not come to a conclusion, and I would therefore suggest, that the subject be decided at the next meeting.

5. The Section are of opinion, that Major Troyer has the first right to print the unpublished portion of the Raja Tarangini; at the same time they would recommend, that a careful copy of the MS. be taken, before it is transmitted to Major Troyer.

E. ROER,

With reference to the above Report, it was agreed that the extract relating to the rite of Anterjali, be communicated to the Rev. Mr. Keane.

Proposed by Mr. Elliot, seconded by Mr. Seton Karr, and agreed unanimously, that 300 Co.'s Rs. be expended from the Oriental Fund on the purchase of such Tazkiras as Mr. Hall might select for the Library of the Society.

Read a letter from the Secretary of the Oriental Section, sending translation of a letter from Dr. Maximilian Muller, with a specimen of his forthcoming edition of the Rig Veda Sanhita.

East India House, 18th Dec. 1847.

MY DEAR SIR,—From the last numbers of the Journal of the Asiatic Society of Bengal, I observed the active zeal with which the Asiatic Society intend again to show their interest in the ancient literature of India. An edition of the Vedas in India under the direction of a European philologist, who can avail himself of the assistance of bráhmans acquainted with the Vedas, and of the rich collections of MSS., has been a wish long time cherished by many scholars, especially in Germany, since the decease of Rosen. The interest and enthusiasm for Indian antiquities appeared unfortunately to have ceased of late in India; since Wilson's departure, and Prinsep's death there have been no scholars to represent and promote such undertakings. Your numerous articles in the Asiatic Journal were after a long time the first which gained for the ancient Sanskrit again an honourable place, beside the laws of storms, &c., and the learned world observe with pleasure, that by your connection with the Asiatic Society you have laboured to revive a general interest in Sanskrit literature.

Could I have a short time ago anticipated, that an edition of the Vedas with commentary should be published in India, I would not have thought of entering here upon such an undertaking, but I heard unfortunately of the intention of the Asiatic Society, when I had already for three years been occupied with collecting materials for an edition of the Rig Veda and its commentary, and when I had made engagements which did not permit me to give up my plan. But even if you should not publish the Rig Veda, as I perceive from the August number of your Journal, I rest satisfied, that you will use the rich materials at your disposal in India in the interest of other Vedaic works, especially of such as like the Taittiriya Sanhita and Bráhmaṇa are entirely inaccessible in Europe.

You know yourself how difficult it is to publish in Germany a new work in Sanskrit. We have no MSS., especially no commentaries, which we have to refer to in the room of Indian Pundits, and a long stay in Paris or London to collect in the Libraries manuscript materials, is difficult and expensive. I had for a long time entertained the desire to know more about the Vedas than it is possible from Rosen's work, and when I had three years ago an opportunity to proceed to Paris, it was my principal endeavour to study the Veda MSS. and to copy as much as I could for an edition of them. I indeed succeeded to maintain myself so long in Paris, that I copied and compared the greater portion of Mádhava's commentary. The Bibliothèque Royale possesses a pretty complete copy of this commentary, beside several MSS. of some portions, especially of the first book. But, however correct the MSS. of the text of the Vedas generally are, those of the commentaries are very much corrupted. At the commencement of my labours I nearly despaired

to give a correct reversion of them, since they are not only full of mistakes in difficult passages, as in the quotations from the Bráhmaṇas, from Aswáyana and Pàṇini, but since even the simplest groups of letters are generally incorrect. Yet I did not give up my task, and after having studied several works introductory to the Vedas and having copied the Nighanta and Nirukta, the Sútras of Aswaláyana with commentary, and also the Aitariya Aranyaka and Bráhmaṇa, and Mádhava's commentary of the Yajur Veda, I became familiar with the style of the commentaries and the mode of expression in the Vedaic writings, and when E. Burnouf placed also his pretty correct MS. of Mádhava's commentary at my disposal, I seriously thought of editing this work, and went to England for the purpose to complete and compare my manuscript materials. Although I did then no longer despair to restore a correct text of the Vedas and its commentary, I met with the new difficulty, how to publish so extensive a work. I entered into proceedings with the Academy in Petersburg, but I was obliged to give up my plan from circumstances which I could not control. A German bookseller offered then to print the work, but only under the condition, that a sufficient number of subscribers could be obtained. When I at last applied to the East India Company for a subscription, I was informed, that the Directors declined a subscription, but that they were ready to print the work at their own expense in England. Although I cannot deny, that I would have preferred to publish the work in Germany, and although from my staying in England, my German career must necessarily be somewhat retarded, yet I had to consider the many advantages I could derive from the use of the MSS. in London. Above all the success of the undertaking was by the liberality of the Directors so completely secured, that I at last resolved to remain in London. I then commenced immediately to print, and although I at first slowly proceeded in consequence of some typographical arrangements, I have now the satisfaction of getting every week one sheet through the press.

There is no want of MSS. here. Beside those I collected in Paris, I have Colebrooke's copy for the commentary, another, although incomplete, copy of Taylor, another more modern from the collection of Prof. Wilson in Oxford, and lastly a copy Dr. Mill kindly lent me from his private collection. But as I observed before, these MSS. are incorrect; moreover, nearly all of them are derived from the same source, and as they almost invariably present the same errors, they have hardly any value as MSS. A good old MS., if possible from the southern part of India, would be of great use to me, especially for the last books, since I have more MSS. for the first Ashtakas than for the others. There are not many various readings of importance with the exception of additions and improvements which occur in more modern MSS., especially in that of Burnouf, which is copied by the

Marathas, and may therefore contain marginal notes, made by scholars of that country. Where I thought them useful, I have retained them, and it would be interesting to examine, whether Mádhava's commentary has been subjected to a still farther emendation, especially in the Dekhan. Should you be able to purchase or borrow some other MSS. from India, you would confer a great obligation upon me; but the copies ought not to be of modern date, which, as I said before, we have here in abundance. I believe I can render the text correct by the means of the MSS. at my disposal, especially by the MSS. of Dr. Mill.

I take the liberty to send you the first 120 pages of my edition, and request your candid opinion concerning them, as by your labours on the same ground you are best able to judge. The introduction especially presents a number of difficulties, and I was obliged to devote a long time to the study of the Purva Mimansa, to understand and verify the quotations from Jaimini and Mádhavá's Nyaya-mala-vistara, and to follow, by the assistance of other works, for instance of Sabará's commentary, the complicated, but logically precise argumentation. I have added the passages from Pánini, for the purpose of facilitating its study, as it is often difficult to find the Sútras, if they are not complete, and especially the Varttikas, which Boethlinck has unfortunately often omitted in his otherwise useful and diligent edition of Pánini. I also quote Unádi and Philsútra, Nirukta, Prátisákhya and Aswäláyana, which (quotations) will of course more and more cease in the latter books. I have not entered upon the quotations from the Bráhmaṇas, as I was not able to verify all of them; moreover the division in these works is so uncertain, that it appeared more expedient to wait for an edition of the text. I intend, however, to verify and explain in my notes the most important quotations from these works also. I did not think proper to omit passages of the commentary, first, as it is a work of reference, where it is irksome to be referred from one place to another; and secondly, as in the repeated explanations important additions and differences are frequently met with. I am, however, willing to improve, where improvements can be made, and I should therefore feel greatly obliged, if you would transmit these printed sheets to some of the most learned pundits in Calcutta or Benares for their opinion. It is of course my wish to render this edition useful also for India, and it would be very interesting to me to hear the opinion of Indian scholars, especially as most of them appear to believe, that no European could satisfactorily execute a work of this kind. I would especially be gratified to hear the opinion of learned men above the prejudices of their country, as Raja Radha Kant Deb, for instance, who by his dictionary has acquired the lasting gratitude of all Sanskrit scholars, and who best knows, that the ancient literature of India need not to be screened from the light of publicity, but

may boldly challenge the comparison of the literatures of all nations the history of which shows the same progress of intellectual development. There is no necessity that I should here dwell on the high value of the Vedas, since you no doubt have the same opinion with me, that they, among works of a similar kind, are the most interesting and important productions of the human mind, and give us the most valuable disclosures on the history, language and intellectual development of a people highly gifted by providence with the happiest faculties. It is true, to find the proper value and true sense of these hymns, we must frequently deviate from the scholastic explanations of Mādhusa, however great the regard may be we are to place on his commentary, founded as it is on ancient tradition. I intend to publish my view of the Vedas in a German translation, after the Sanskrit text has been completed; Prof. Wilson has, however, promised an English translation, which will probably be attached to every volume of the text.

I would not have ventured to address you so long about my own affairs, did I not suppose that you take yourself a lively interest in the success of an undertaking for which you have worked with so zealous an activity. It would give me great pleasure to hear which part of Vedaic literature you have chosen first to treat on, and with regard to this I would draw your attention to the fact, that the Vajasanica Sanhitā will probably soon be published by Dr. A. Weber in Germany, and also that Bardelli prepares an edition of the Atharva Veda. Yet there still remains for you a rich field in India, especially respecting the Brāhmaṇas, in which the European collections are comparatively poor. As soon as the first volume of my edition is completed, I will forward the subsequent sheets to the Asiatic Society.

Jan. the 10th.

I am sorry that the transmission of my letter has met with some delay. I placed it inside of the copy, in the hope, that you would thus most certainly receive it. The sheets have, however, been sent off separately by the Directors. The printing has now made further progress, and I trust to be able to publish in the course of this year a large volume. In conclusion I take the liberty to ask you, whether there is an opportunity in Calcutta to purchase or copy a large number of MSS. The Prussian Government, which has bought on a former occasion, the collection of Sir Ch. Chambers, is desirous to vote an annual sum to complete their collection, which is especially indispensable with regard to the commentaries to render these MSS. useful. You would also do great service to all German Sanskrit scholars, if you could inform me about the mode of doing this, principally about the terms of copying, unless this gives you too much trouble. The money of course would be deposited with an Indian banker, and the Prussian ambassador in London, Chevalier Bunsen, takes an active interest in this undertaking.

P. S. Would it give you much trouble to ascertain in Calcutta, whether a copy of the octavo edition of Manu with commentary may be there obtained. In Europe it is not procurable. Could you also inform me, how I may obtain a copy of the Sabda-Kalpa-Druma, or if it is not for sale, would you in my name request Raja Radhakant Deb to favour me with a copy.

With reference to the desire of the Prussian Government to have copies made in Calcutta at their expense, of several Sanscrit MSS. and works required to complete their collection, the Council recommend that the Society afford all facilities for the accomplishment of the wishes of the Prussian Government. (Agreed unanimously.)

From Dr. Roer, forwarding letters from Prof. Lassen and Mr. Koenig.

Extract of note from Dr. Roer.

I send you a letter from Professor Lassen to my address, in which he requests me to thank the Society for the copy of Abdul Razzaq's Dictionary with which they presented him, and also to inform the Society, that he has despatched the second part of the first volume of his "Indian Antiquities." He further mentions, that Dr. Benfey, in Goettingen, is publishing the Sáma Veda, and that Dr. Weber, on the part of the Berlin Academy, has gone to England to collect materials for an edition of the Vasaneyá Sauhitá. Mr. Koenig has requested Professor Lassen to express his wish to receive regularly every month 25 copies of our Journal, and has no doubt that this number would be disposed of, as there are so many Universities in Germany, all of which would like to get the Asiatic Journal, if regularly transmitted.

Here are also two letters from Mr. Koenig, the one lately received, in which he states, that he has forwarded on the 20th December last a package of books to the Asiatic Society, accompanying this letter.

There is, however, no list, as he mentions, but it is in his other letter of the 14th December, 1846. On receiving this the Asiatic Society resolved to send him the works he asked for in exchange of those he offered to the Society, and I was then requested to obtain the works for Mr. Koenig, but as he had at that time not despatched the books for the Asiatic Society, I thought it right to wait, until we received information that the books were actually sent off.

Will the Society now authorize me to get the books in Calcutta and to despatch them by the first opportunity that offers. The Librarian has also a list of them, and has told me that he can get them in Calcutta at any time they may be required.

27th March, 1848.

E. ROER.

To the Secretary of the Asiatic Society of Bengal.

SIR.—I have received the valuable consignment of Sanscrit books which the Royal Asiatic Society has done me the honour of sending to my address. I beg leave, by your kind mediation, to offer to the Society my best acknowledgment of the favour with which they have been pleased to notice my editorial efforts for propagating the Oriental studies in this country. As a slight token of my gratitude I hope the Society will kindly accept the following books, which I have lately published and which I shall dispatch to India by the first opportunity; these are 1.—*Sanskrit—Mudra Rakshusa*, cum glossario instructum, edidit N. Delius, 12 copies. *Bibliotheca Sanscrita*, ed. Gildemeister, 20 copies. Lexicon and Index to *Panini* by Golstücker 12 copies. *Karmavakyā*, ed. Spiegel, 12 copies. *Mricchakati* ed. Stenzler, 12 copies. *Panchatantra*, ed. Kosegarten 12 copies. 2.—*Lassen's Indische Alterthums-kunde* Vols. and 1. 2, 6 copies. *Lassen's* and *Westergaard's Keil Inschriften*, 3 copies. 3.—Other Oriental books. *Rieu Abul Ala*. *Tommer's biblische Abhand-lungen*, 12 copies. Schleicher's Sprache des Osseten. *Lassen's Zeitschrift für die Kunde des Morgenlandes*, Vol. VII. 2 copies. 4.—*Classical Philology*. *Grafen-han's Geschichte der Philologie* 4 Vols. 2 copies of *Lersch's Sprachphilosophie* der Alten, 3 Vols. 2 copies. *Nækis*, Valerius, 3 copies. 5.—*Shraf's Topo-graphy of Jerusalem*, 2 copies.

As the Society is fully aware of the importance of the university of Bonn as a central point of Oriental studies in Germany, and of the constant applica-tions which are made to me as the chief publisher and bookseller for this department, I hope to be excused for the apparent freedom which I take in asking the Society's liberality to send me the following books which are in their possession: viz. *Institutes of the Hindú Religion*, by Rughu Nundun, 2 copies. 21 Separate dissertations of Rughu Nundun, 2 copies. *Nirnaya-sindhu*, 2 copies. *Panc'apaksi*, 2 copies. *Rudracandi*, 2 copies. *Shamarū-paydtrapaddhati*, 2 copies. *Menu Sanhita* with Kulluka Bhatta's com-men-tary, 6 copies. 16 *Sanhitas* by *Bhavanic'ara* 2 copies. *Sankyapravācanabhā-shya* 2 copies. *Rāmaratnd's Amarakosha* 2 copies. *Sabdakulpalatika*, 2 copies. *Vrittaratnavali* 2 copies. *Prakastiprakasika*, 2 copies. *Ganitadhia* 2 copies, *Goladhia* 2 copies. *Grahtagara* 2 copies. *Bhagavata purana*, *Suapuvdhaya*, *Bhagavadgīta*, *Prabodhachandrodaya*, *Abhijnānasakuntalā*, *Mahanatka*, *Gitagovinda*, *Rasatarangini*, *Hitopodesa*, *Sanskritamālā*, *Bhas-kara's Vijaganito*.

To the celebrated Radha Kant I shall, by the same opportunity, transmit a copy of all my publications which I have sent to the Society, for which consignment you, Sir, will be kind enough to procure one or two copies of the celebrated Sanskrit dictionary published by Radha Kant. The distin-guished author will perhaps be the more inclined to comply with my wishes

as he will benefit by it in a high degree the Oriental students in Germany, as I don't design this work for sale, but shall religiously keep it for the numerous applications made to me for its use.

I am Sir, your's,

H. B. KOENIG.

Bonn, Dec. 14th, 1846.

To the Secretary of the Asiatic Society of Bengal.

SIR,—For those books sent to me by favor of the Asiatic Society of Bengal, as advised by letter of the 7th of June 1847, by Dr. T. H. E. Roer, I beg to offer my sincere thanks to the said Society. The books have as yet not arrived.

Through the kindness of Messrs. Allan and Co. London, I forward to your address this day the already announced package of books, containing 97 volumes, as per enclosed list, which I have the honour to beg the Asiatic Society to accept of.

At the same time I take the liberty to enclose in the above mentioned package a parcel of books addressed to Rajah Radhakant, which I beg you will have the kindness to forward to this gentleman, as a small token of the high regard I entertain for him, and an acknowledgment of gratitude for his valuable work which he had forwarded to me. You will find in the package an open letter addressed to Rajah Radhakant, which will inform you of the volumes destined for him.

I have the honour to be, Sir,

Your most obedient servant,

H. B. KOENIG.

Bonn, December 20th, 1847.

Extract of a note from Capt. BROOME.

"I send herewith a copy of the Raja Tarangini I have just got down from Cashmere. Its history is this: Mr. Piddington (when I was at Jummoo) forwarded to me a letter from Capt. Troyer in Paris asking him to procure a complete copy with the two last, though apocryphal, books. I inquired and found that in addition to the books of the Pundit Kuhn, there were three continuations of the work by different hands, bringing it up to a comparatively recent date. I ordered the *whole* to be carefully copied, and here is the result.

I intend this for Capt. Troyer and shall send it to him, but I think it would be well to have a copy of it in the Society's Library, and also to have it examined to see if it is what it purports to be, and if there is much more or valuable information in it. If there is, the latter portion (untranslated by Troyer) might answer well for the monthly serial now started."

*Natural History Department.**Council of the Asiatic Society, 5th April, 1848.*

The Council submit a Report received from the Section of Natural History on the reference made to the Section respecting Mr. Blyth's claim for an increase of salary and a retiring pension. The Council propose that the Report be received and adopted by the Society.

W. B. O'SHAUGHNESSY,

Secretary, Asiatic Society.

The Secretary's letter, forwarding the Report, recommended the immediate preparation of a collection of shells to be forwarded to Mr. Cumming in return for his donation, and the payment of £25 10s. for works on Conchology sent by Mr. Cumming on the part of Messrs. Sowerby and Reeve. A similar recommendation was made in favor of Mr. Van der Busch of Bremen ; and with reference to an application from Mr. Mitchell for a gift of specimens of Natural History for the Museum of Montrose, regret was expressed that such a donation could not be advised. The above recommendations were unanimously adopted by the Society,

With reference to the Report on Mr. Blyth's application, the Report having been read, and the question put as to its adoption by the Society,

Mr. Newmarch objected to the Report as conceived in an illiberal spirit, and treating of matters on which the Section were not invited to offer their opinion. He proposed that it be laid on the table during the ensuing month, and be discussed at the May meeting.

This proposition having been seconded by Capt. Thuillier,—it was agreed, at the instance of Dr. Falconer, that it should be decided by ballot.

A ballot was accordingly taken, when 16 balls were found in favor of, and 11 against Mr. Newmarch's motion.

A majority of two-thirds being required to carry a vote by ballot, this result caused considerable embarrassment and led to much discussion.

Mr. Bushby said Mr. Blyth should be afforded every opportunity of replying to the serious charges against him made in the Report.

Mr. H. M. Elliott then moved, seconded by Mr. Heatley,—

That before the report of the Section of Natural History with respect to Mr. Blyth be adopted, Mr. Blyth be afforded the opportunity of submitting a

reply to the comments upon his conduct as Curator, and that the same be laid before the next meeting, through the Council, for consideration.

The general sense of the meeting being that this proposition should be decided by show of hands, it was put accordingly, and carried by a large majority.

Council of the Asiatic Society. (Honorary members.)

Dr. Falconer having represented to the President, and through him to the Council, that the mode of electing an Honorary member adopted at the last general meeting was irregular, inasmuch as it was decided by a show of hands and not by ballot, pursuant to the 6th of the original rules adopted from the Founder's discourse, by which it is decided that all questions shall be decided on a ballot by a majority of two-thirds, the President and Council whilst they express their thanks to Dr. Falconer for calling their attention to this inconsistency between the practice and the rules of the Society, beg to state that they have ascertained that for a period of eight years the election of Honorary members, the election of officers,* and all other questions have been decided by a show of hands, and not by ballot. The President and the Council are therefore of opinion that it would be inexpedient to reconsider the election of any one or more of the Honorary members who have been elected, or to open any question which has been decided by a show of hands, or by written votes. They are also of opinion that to decide every question however trivial which may require the formal decision of the Society by a ballot, would be extremely inconvenient, and they are therefore not inclined to recommend the observance of rule 6th in its literal strictness. To meet however the wishes of Dr. Falconer, and such other members as may agree with him in thinking that the elections of Honorary members should be more solemnly conducted than they have lately been, the President and Council do recommend that in all future cases Honorary members be elected by ballot, and that no such election take place unless a detailed statement of the literary or scientific services of the proposed Honorary member be submitted to the Society at the general meeting next previous to that fixed for the ballot.

By resolution of the Council,

W. B. O'SHAUGHNESSY,

Secretary.

Asiatic Society, 31st March, 1848.

Dr. Falconer, with reference to the above communication, stated that it overlooked the principal ground upon which his objection rested and

* Except the last annual election, which was by written votes.

noticed only the minor ones. The circumstance of there having been no ballot, although irregular, was but an adjunct : his main objection was, that the election took place, on a mere verbal intimation by the Secretary. There was no ballot certificate, nor report brought up from the Council, nor a certain voucher of any kind, laid before the meeting ; nothing in short upon which a valid election could take place. He quoted from the "Gleanings," vol. 1. p. 59, a resolution passed by the Society, on the 5th December 1828, prescribing the procedure for the election of Honorary members, none of the provisions of which had been observed on the late occasion. Under all the circumstances he considered that the election should be gone through de novo ; he did so solely out of respect to the rules and statutes of the Society, and would himself cordially support Dr. Henry's election.

The Secretary replied he had done exactly as had been done for ten years in all similar cases. He produced the written resolution signed by the President, three Vice Presidents and nine members of the Council in favor of the election, which he last month stated had been accidentally mislaid, and expressed his extreme regret that the slightest informality should have occurred.

A re-election being generally objected to on the grounds that every election of the last ten years should be similarly remanded to a new ballot, Dr. Falconer handed in and read a written "Protest" signed by himself and Dr. Walker, against the proceeding in question.

The question being put whether this Protest should be printed, Mr. H. M. Elliot proposed, seconded by Mr. Welby Jackson, that the Protest be not printed. Mr. Elliot having claimed a ballot, his proposition was carried by a majority of 18 to 5 balls.

Council of the Asiatic Society.—Repairs of House.

The Council Report that eleven beams in various parts of the house having been found to be totally destroyed by white ants, and a professional survey having shown the premises to be in need of immediate and thorough repair, the Council have, as authorized by the last annual meeting, accepted the estimate rendered by Mr. Vos, and directed the repairs, &c. to be commenced forthwith.

This will render it necessary to close the premises with the exception of the Library for between two and three months, and the Council advise an adjournment of the monthly meetings during that period, all

papers and correspondence being meanwhile referred to the Council, and the Journal issued regularly as at present.

The Council observe that for the early years of the Society, the meetings were always adjourned from April to October, in each year.

By resolution of the Council,

W. B. O'SHAUGHNESSY,

Secretary.

Asiatic Society, 5th April, 1848.

This proposal was unanimously adopted except as far as relates to the suspension of the meetings, which it was resolved should be held at the usual monthly intervals at such place as the Council might select.

The Secretary then stated that he was authorized to inform the meeting that the Nawab Nazim of Bengal, Honorary member of the Asiatic Society, had signified his intention of presenting the Society with a massive pair of iron gates and complete iron railing for the enclosure of their premises.

The cordial thanks of the Society were voted unanimously, for this munificent donation, to be conveyed through Mr. Torrens, to whose instrumentality it was understood, the Society is mainly indebted for the Nawab's gift.

The Librarian submitted his monthly report, as follows :—

List of Books.

LIBRARY.

The following books have been received since the last meeting.

Presented.

Description of the Asafoetida Plant of Central Asia.—**BY H. FALCONER, Esq.**

Account of Gamoplexis, an undescribed Genus of Orchideous plants.—**BY H. FALCONER, Esq.**

The Oriental Christian Spectator, Vol. IX. No. 2.—**BY THE EDITOR.**

Journal of the Indian Archipelago, Vols. I. and II. No. 1.—**BY THE GOVERNMENT OF INDIA.**

General Observations on the Provinces annexed to the Russian Empire

under the denomination of the territory of Armenia. Translated from the French by S. Marcar.—**BY THE AUTHOR.**

Bibliographia Armeniaca, or a miscellaneous work in the Armenian language. By S. Marcar.—**BY THE AUTHOR.**

Meteorological Register kept at the Surveyor General's Office, Calcutta, February, 1848.—**BY THE OFFICIATING DEPUTY SURVEYOR GENERAL.**

Nityadharmánuranjiká, Nos. 49 to 55.—**BY THE EDITOR.**

Oriental Baptist, Vol. II. No. 16.—**BY THE EDITOR.**

The Upadeshak, No. 15.—**BY THE EDITOR.**

The Calcutta Christian Observer, April, 1848.—**BY THE EDITORS.**

Journal of the Indian Archipelago, Vol. II. No. 1.—**BY THE EDITOR.**

Wilson's American Birds, and 188 original drawings,—**BY LORD ARTHUR HAY.**

Exchanged.

London, Edinburgh and Dublin Philosophical Magazine and Journal of Science, No. 212.

Calcutta Journal of Natural History, No. 30.

Edinburgh Philosophical Journal, No. 87.

Purchased.

North British Review, No. 15.

Edinburgh Review, No. 175.

The Annals and Magazine of Natural History, No. 1, of 1848.

Comptes Rendus Hebdomadaires des Séances de l' Académie des Sciences, January to December, 1846, and Nos. 22 to 25 for 1847.

Journal des Savans, November, 1847.

Gould's Birds of Australia, Nos. 28 and 29.

Report of the Curator Museum of Economic Geology for the month of February and March.

We have not had many contributions of importance during these months, and I have been occupied with many details and some researches which are not yet forward enough to report upon if successful.

Economic Geology.—Dr. Spilsbury forwarded to us sometime ago a specimen of a "Swamy Stone" used for polishing steel arms and accoutrements by the Madras Sepoys, which as a mineral differs entirely from what we before obtained and somewhat in its manner of use. The friend who sent it to Dr. Spilsbury says:—

"I regret being unable to furnish you with such information as you require regarding the so called "Swamy Stone" used by the Madras Sepoys for polishing arms and accoutrements, nor can I gain for you any as to its locality. The mode of using it is very simple; a few drops of oil being put in the con-

cave stone rub with the other until a paste is formed, which with friction by the hand on either steel or brass will produce a beautiful polish."

It will be recollectcd that I ascertained the Swamy stone sent from Europe by Major William's brother to be an Agalmatolite, but the present one is altogether of a different class of minerals, and I am indeed at present inclined to suppose it to be the red variety of the rare and little known mineral Indianite; but I am desirous of obtaining if possible more of it from Dr. Spilsbury, before destroying the appearance of our present specimen (in its Economical point of view) by taking sufficient for quantitative analysis which alone can test the correctness of my supposition, as the mere physical characters and such qualitative examination as I have been able to make from splinters will not suffice. The (undoubted) presence of Magnesia also in our specimen, though but in a small per centage, would make it differ from Indianite; but this may be a chance impurity.

Another addition to our Museum is a specimen of the Muscat Rock Salt, which contains I find a considerable portion of Gypsum. This when the salt deliquesces is left in minute crystals on the surface. This impurity is no doubt the cause of the decomposition, which is said by those in the trade, to go on when this salt and white salt (sea water salt) are in contact; but the action is obscure, unless we also suppose the presence of organic matter (from infusoria) to decompose the sulphate of lime.

The salt contains also muriate of lime and sulphate of soda, as usual in all mineral salts.

Captain Sherwill has presented to us a complete set of specimens of the re and vein-stones of the lead and antimony veins near Bhaugulpore, of which he had before sent us specimens, and he has accompanied them with a sketch map of the locality.

These are on the table and are—

- No. 1.—Found over the lead.
- No. 2.—Pieces picked from the surface.
- No. 3.—Soil of the surface.
- No. 4.—Walls of the vein.
- No. 5.—Ore.
- No. 6.—Dyke traversing the vein.

He has also presented an enamelled brick, found in some ruins in the jungles of the Rajmahal Hills, and a few specimens, said to be those from which gold is obtained at some place in the Straits of Malacca, which, if this be correct (for it is a tale of 20 years ago, as told to Captain Sherwill, by a friend) is new; for they are partly copper ores, grey copper, Malachite, and copper pyrites, which were not before known, I think, as being amongst the wrought auriferous ores of the Straits, nor that even the iron pyrites of those localities

were so, and two of the specimens are of this description and perhaps auriferous, but too small for examination.

Captain Jenkins has sent for examination two specimens, which I presume to have been the silver ore reported some time back in the papers, as he says of them that they "have been sent in as something very precious," but he supposes them to be nothing but pyrites in an unusual form;" and in this he is right, as they are nothing more than Arsenical Pyrites, the Mispicked of the Cornish Miners, deposited in, or which have taken the form of, part of the stem of a plant and are wholly valueless, as they do not contain a particle of any precious metal.

Mr. Cheap, B. C. S. has presented us with a tray of specimens from Egypt from which we shall be able to select a few good additions to our building materials, and one or two to our geological collections. Mr. Cheap's letter to Mr Laidlay says:—

"Beauleah, 26th February, 1848.

"MY DEAR Sir,—It is hardly necessary for me to describe the specimens but the localities of some may be interesting and enable others to make, similar collections if desirable. The Syenite is all from the quarry at Assawan (the Syene of the ancients). The Sandstone from the large quarry at Silsilis in upper Egypt, from which nearly all the stone employed to build the temples in Egypt is supposed to have been taken, and the enormous space left blank leaves very little doubt that the materials of these magnificent temples were hewn from these quarries. There are among the specimens some round stones of a species of flint with circles in the centre. These I picked up in the valley leading to the tombs of the kings behind Goomoo, and opposite to Thebes. What is singular as regards them is that the Egyptians make their bread (or rather biscuit, from its hardness) exactly like these in upper Egypt, and must, from these stones, have taken the idea of the shape and form. The only other specimen that requires notice is a lump of black granite. This I picked up near the temple said to have been erected by Philip Arideus or Alexander (son of Alexander the great) when Ptolemy was governor of Egypt in their name. The temple is about the centre of those at Karnac, and it is the only one built of this granite and the facing only is composed of it. You will observe it is very black, and would no doubt stand a good polish. It is very similar to what is used to build the Sona Mosjeed or Mosque at Gour, and also one of the Mosques at Rajmahal. The specimens were all collected by me during the months of October, November and December, 1841, in Egypt, and if of any use to the Society I beg you will present them for me at the next meeting."

Lord Arthur Hay has obliged us with four specimens of graphite, of which three are from Travancore and one from Ceylon; the Ceylon specimen is remarkable for its large lamellæ, and one of those from Travancore for its very large and well separated fibres.

Geology and Mineralogy.—I obtained at an auction a very handsome specimen of the bluish grey Pumice of Aden, interleaved with minute laminæ of gypsum, resembling mica, which is an addition to our cabinet which is not as yet well furnished with the numerous varieties of this remarkable, though common mineral.

From Captain W. S. Sherwill, of the Dinapore Survey, we have received another of his valuable and beautifully executed Geological Maps of the part of Zillah Monghyr south of the Ganges, and part of Zillah Bhaugulpore which include the Kurruckpore hills and the hot well district, with a case of specimens, a few of which are on the table.

H. PIDDINGTON.

The proceedings of the evening were terminated by Mr. Blyth's usual exhibition of novelties and donations in his department during the past month.

Certified to be a true Report,

J. W. COLVILE, *President.*

W. B. O'SHAUGHNESSY, *Secretary.*

Report of Curator, Zoological Department.*

The donations received since the last meeting of the Society are as follows :—

1. G. T. Lushington, Esq., Almorah. A skin of the Kyang (*Equus hemionus*, Pallas), with skull and limb-bones attached, and perfect, excepting that it has been mutilated of about half of one of the ears. Unfortunately, a quantity of water had penetrated into the tin-case in which it was packed, or this specimen would have arrived in fine condition. As it is, it does not appear to have received much injury, and will, I think, bear setting up. The animal was killed at the season of shedding its rough winter-coat, and exhibits in parts both this and its summer pelage.

2. Baboo Debendernáth Tagore. The carcass of an adult male Hoolock (*Hylobates hoolock*).

3. Mr. DeCruz, of the Botanic Garden. A particularly fine specimen of the common Bengal Civet (*Viverra zibetha*).†

4. Raja Buddenáth Roy. A dead specimen of the Cockatoo Parrakeet (*Nymphicus novae hollandiae*).

5. J. Laidlay, Esq. A dead River Turtle, or *Trionyx*, the *Gymnopus Duvaucelii*, Dum. and Bibr.; and numerous specimen of Bats—*Cynopterus*, *Megaderma*, and *Nycticejus*.

6. R. W. G. Frith, Esq. A dead Shúmal (*Kittacincla macrourus*), in fine plumage.

7. Mr. Birch, of the Pilot Service. Various fish, crustacea, &c., collected at the Sandheads.‡

* For February meeting, 1848.

† This species, which on the eastern side of the Bay of Bengal extends southward into the Malayan peninsula (where, however, it is much rarer than *V. tanggalunga*), and is found also in Assam and in the valley of Nepal, does not appear to occur in the peninsula of India, unless partially to the N. E. on the confines of Bengal; but in the extreme south, as in Travancore, it is represented by an allied race which entirely resembles the African *V. civetta*, except that the dorsal crest is not continued forward to between the ears. There is a specimen of this race in the Museum of the Zoological Society, referred to *V. sibetha* in Mr. Waterhouse's Catalogue of the Mammalia in that collection, and said there to be from Sumatra, having been presented by Sir Stamford Raffles; but I strongly suspect that this habitat is erroneously assigned, especially as the specimen was formerly labelled as having been presented by the late duke of Northumberland.

‡ Among Scomberide lately contributed by Mr. Birch and others, may be enumerated *Chlorinemus aculeatus*, (Bloch), C. and V. *Hist. Poiss.* VIII, 282, *Caranx nigripes*, ibid. IX, 92, *Stromateus securifer*, ibid. IX, 293, *Curtus Blochii*, ibid. IX, 312, *Equula insidiatrix*, ibid. X, 72, and a *Pelamys* which appears to be undescribed. I may also

8. Capt. Phayre, Moulmein. A specimen of *Tupaia javanica* (*v. peguana*) in spirit, and three skins of Squirrels, viz. *Sc. chrysonotus*, *nobilis*, *Sc. atrodorsalis* apud nos, var., and *Sc. pygerythrus* (?), Is. Geoff., var.

Of these, the species referred to *Sc. atrodorsalis* is unquestionably identical with that from the province of Ye, described in XVI, 872, but differs from it very remarkably in having the under-parts and inside of limbs deep maronne-red instead of dilute rusty, the throat and front of the neck being weaker-coloured in both, and the hairs of the tail are distinctly annulated, which is not the case with the former specimen. Mr. Gray's description of *Sc. atrodorsalis* (quoted in a note to XVI, 873), if his species be truly identical with the Tenasserim one, would indicate a third variety of colouring. The long white or yellowish-white whiskers would seem to constitute a marked feature of all three.

The Squirrel which I refer to *Sc. pygerythrus*, var., accords in size and proportions with *Sc. vittatus*, except that the tail is longer and more bushy. Entire upper-parts uniformly grizzled, much as in that species, or more especially as in the tail of that species,—the tip of the tail being black : under-parts, inside of limbs, fore-paws above, and almost the entire hind-limbs exteriorly, together with a broad median line to the tail underneath continued to its black tip, bright ferruginous-chesnut ; that of the belly bordered laterally with black : whiskers black. This animal accords very well with my brief note of *Sc. pygerythrus*, except in having the four paws light chesnut-rufous above, continued over the exterior of the hind-limbs : and coming from the Tenasserim provinces, it is far more likely to be the true *Sc. pygerythrus* of Pegu, that the very distinct species inhabiting the extreme south of India, which Mr. Elliot would refer to the same (XVI, 1272).

Among the specimens procured in the neighbourhood may be remarked a small grey *Ephialtes*, having a rufous tinge on the aigrettes and slightly elsewhere in parts, which satisfactorily shows the identity of *Scops sunia* and *Sc. pennata*, H., conformably with Mr. Jerdon's expressed opinion on the subject (vide XIV, 550). The variation is analogous to that of the N. American *Eph. asio* (comprising the Red and Mottled Owls of Wilson), and to a less extent it is observable in the common *Syrnium aluco* of Europe, as well shown by the specimens of this bird in the Society's museum. Mr. G. R. Gray unites *Sc. pennata*, H., with *Eph. scops* of Europe ; from which it is

notice an interesting Clupeaceous fish, the *Apterygia ramaarata*, Gray, of Hardwicke's Illustrations, four specimens. M. Valenciennes doubts the existence of this fish, vide *Hist. Poiss.* XX, 333 ; supposing it to be either a mutilated or imperfectly represented individual of his *Pristigaster tartoor* : but the total absence of the dorsal fin proves to be a normal character of the species.

indeed hardly, if at all, distinguishable ; but I am unaware that the latter is subject to the same variation of colouring, at least in Europe ; and it does not appear that this variation depends, in any degree, upon the age or sex of the specimens.

Rhynchaea bengalensis. Three newly hatched chicks of this species have been obtained and added to the collection : I have before taken a fully developed egg from the oviduct of a 'Painted Snipe ;' and have several times met with the half-grown young, which resemble the *adult male*, not the larger and more finely coloured *adult female*.

Mystus chitala, Buch. Ham. A specimen of this common fish, remarkable for having several large black spots scattered over the whole sides of the body, though only below the lateral line. In all other respects, perfectly identical in its characters with ordinary examples of *M. chitala*, which species I have never previously observed to vary in this way, though the number of tail-spots is very irregular.

Strix delicatula (?), Gould. A specimen received long ago from Europe as the common *Str. flammea*, was most probably from Australia in the first instance, but is even smaller than are the dimensions assigned to *delicatula* by Mr. Gould, and its beak is proportionally the same as in *Str. flammea*. Wing 9½ in. ; tail 4 in. ; tarse 2 in. ; bill to gape 1¼ in. Plumage exactly as in Mr. Gould's figure of *Str. delicatula*.

Having had occasion to look again over Capt. Hutton's specimens (noticed in XIV, 340, XV, 135, and XVI, 775), I find that the Afghanistan species of Cat referred to *F. chaus* (XIV, 342), is of the allied species figured and described in Jacquemont's *Voyage* by the name *F. Jacquemontii*, Is. Geoff. Capt. Hutton's specimen has no blackish markings on the limbs, and is remarkable for a broad ridge of longer hair continued over the whole spine. At the end of the tail are two or three somewhat faint blackish rings.* The species of Cat, No. 6 of Capt. Hutton's list, was treated of in my last Report, and there compared with a specimen of *F. catus* from Scotland.

The *Cyanecula* from Afghanistan (XVI, 780), is probably of the species lately distinguished by M. Eversmann, by the name *Sylvia cyane*. That common in India, according to Mr. Strickland (*in epistola*), appears to be the true *Motacilla suecica* of Linnaeus, of which *M. caerulecula*, Pallas, should therefore be a synonyme ; and the bird of southern Europe, currently referred to *suecica* (*vera*), must stand as *C. Wolfi*, Brehm. It does not yet appear that there are any differences by which the females of these three races may be discriminated.

E. BLYTH.

* We have a head of *F. Jacquemontii*, from the Burnes collection.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of April, 1848.

Days of the Month.		Maximum Pressure observed at 9h 50m.				Minimum Pressure observed at 4 p.m.				Rain Gauges.		Moon's Phases.	
Barometer due to Friction	Revolutions per minute	Temperature.	Wind.	Aspect of the Sky.	Wind.	Temperature.	Wind.	Aspect of the Sky.	Wind.	Elevation.	Feet	Lower Feet	Upper Inch
1	23	29.854	83.0	82.0	75.2	N.W.	Cumuli.	..	..	94.0	90.9	0.98	0.98
2	23	.925	83.8	84.4	76.2	S.W.	Cloudy.	..	..	90.0	..	..	..
3	23	.931	86.1	85.9	78.1	S.	Cumuli.	..	..	91.4	..	..	..
4	23	.916	86.9	86.2	77.2	S.W.	Ditto.	..	..	93.0	..	..	..
5	7	.860	86.4	86.9	78.3	S.W.	Cirro cumuli.	..	..	95.0	..	..	..
6	7	.860	88.0	88.1	79.6	S.W.	Ditto.	..	..	94.8	..	..	..
7	8	.792	87.8	87.8	80.0	S.	Cumuli.	..	..	92.5	..	..	..
8	8	.709	86.9	86.9	80.0	S.	sharp.	..	..	97.0	..	..	..
9	10	.683	88.3	88.3	82.4	S.	Ditto.	..	..	90.9	88.8	0.8	sharp.
11	11	.704	88.6	88.9	81.7	S.	..	..	..	95.7	93.9	0.8	ditto.
12	12	.755	88.7	88.7	79.9	S.	sharp.	..	..	98.2	96.4	1.3	S.
13	13	.840	90.2	89.2	80.0	S.	Ditto.	..	..	93.9	92.2	0.8	sharp.
14	15	.786	90.0	89.8	80.1	S.W.	Ditto.	..	..	97.0	93.0	0.8	sharp.
15	15	.758	88.9	88.9	79.9	S.	sharp.	..	..	96.8	93.0	0.8	sharp.
16	17	.786	90.0	88.9	80.3	S.	Ditto.	..	..	92.5	91.7	1.6	S.
17	18	.709	90.0	89.4	81.0	S.	Ditto.	..	..	92.7	91.7	0.2	S.
18	19	.736	91.0	89.8	81.9	S.	Ditto.	..	..	98.7	98.0	0.2	S.
19	20	.747	91.9	90.5	90.7	S.	Cirro ditto.	..	..	96.9	94.4	2.8	S.
20	21	.796	90.0	89.5	79.2	S.	Clear.	..	..	91.3	91.2	0.8	..
21	22	.714	91.3	91.4	79.8	S.	..	..	..	98.3	98.3	0.24	0.32
22	23	.714	91.3	91.4	79.8	S.	Clear.	..	..	96.8	..	..	..
23	24	.783	91.5	90.8	80.0	S.	sharp.	..	..	96.4	95.0	0.8	sharp.
24	25	.813	91.9	90.5	80.4	S.	Ditto.	..	..	97.0	96.5	0.8	sharp.
25	26	.785	92.0	91.5	80.0	S.	Cirro cumuli.	..	..	95.8	94.4	0.4	sharp.
26	27	.705	91.5	91.4	81.5	S.	Clear.	..	..	94.8	93.5	0.8	sharp.
27	28	.683	92.0	91.9	80.6	S.	Cirro cumuli.	..	..	101.0	98.5	3.3	S.
28	29	.701	92.0	91.7	82.5	S.	Clear.	..	..	97.0	96.2	0.9	S.
29	30	.741	92.9	92.1	81.6	S.	Cirro ditto.	..	..	94.3	93.5	0.2	Cloudy.
30	Mean	29.782	89.5	89.1	80.0	..	..	..	..	94.1	92.7	80.5	1.31

in the do. do. of do. was 2.33 Inches.

JOURNAL
OF THE
ASIATIC SOCIETY.

MAY, 1848.

The Turaee and Outer Mountains of Kumaoon.
By Major MADDEN, Bengal Artillery.

The following details, chiefly botanical, comprise the result of observations made during several short excursions from Almorah to the Turaee and Outer Mountains of Kumaoon, between the Kosilla and the Kalee rivers. Performed during the cold season or spring, many deficiencies must necessarily exist, especially as to the vegetation of the Turaee and the mountain range immediately above it, which is most copious and luxuriant during and immediately after the rainy season. A few days' sunshine then suffice to wither and efface all traces of many herbaceous plants. The climate, however, is unfortunately so unhealthy at that season, as to preclude any thing beyond the most rapid transit, and even this small advantage the writer has not enjoyed. Still, he believes the subject may be interesting; the routes including part of a tract intervening between those exhausted by Drs. Wallich and Royle, and never visited by either of these gentlemen.

December 6, 1846.—From Almorah to Munjerd, at the Khyrna Bridge, distant 18 miles. At 5 or 6 miles, below Chousulla village, by a pretty iron suspension bridge, cross the Suwal river, a little above its junction with the Kosilla, which it nearly equals in size. Above this point the Kosilla flows through a very deep and impracticable gorge, formed on both sides of granite, which, at Chousulla, gives place^{to} to gneiss and slate rocks. On the right or west bank, the granite reaches

to within a few hundred feet of the summit of Seeahee Devee, 7200 feet : on the Almorah bank, its elevation does not exceed 5500 feet.

At 10 miles, the road, now keeping the left bank of the Kosilla, passes Muners or Munrus, a village partly on, partly at the base of a hill, in form resembling Tom na heurich at Inverness ; it is about 600 feet above the river, and 3847 above Calcutta ; there is a considerable plateau of cultivation to the south, the revenue of which belongs to Budgenath, across the Kosilla ; Seeahee Devee, covered with pine, rises boldly, " by the first intention," 400 feet ; far in front, on the same side, in the Phuldakot Pergunna, is seen a conspicuous tree on the Sher ka Danda summit, about 6000 feet high ; under this tree is a murhee of Symdeo, the haunt of a *Ganth* or diviner by means of rice tossed on the palm of the hand :—the rogue has selected a site visible to a great distance in every direction. About a mile short of Munrus, the road crosses a small stream from the south by a natural rock-arch, known as Beemota and Bheem ka Sanga.

From Almorah to Munrus, the scenery is bare and monotonous, but now becomes wild and beautiful, with considerable resemblance to the Swiss Val de Moutiers. The river, clear as crystal, dashes on amidst huge quartz rocks, or reposes in deep blue and green pools, abounding in otters " od," and largh fish. The banks rise steeply, covered with a sub-tropical vegetation, which may have crept in here, with the tigers and hot winds, behind the alpine and oak-crowned barrier of the Gagur. Up the long and tortuous course of the river from Chilkiya, about 3 miles short of the Khyrna, the road crosses to the right bank of the river by a new and very elegant iron-suspension bridge on Dredge's principle : the space is 60 paces. Jiaree village, from which it is named, stands several hundred feet above, and the road, forced up by precipitous rocks, to the dismay of the wearied traveller, ascends nearly to the same level, only to fall again, and two miles on, re-cross the river by the Tipulee Dhoonga Bridge, resembling that at Jiaree, but only 51 paces over. The original road followed the left bank continuously, avoiding the necessity for these very creditable but expensive constructions : it has unfortunately become almost impassable, and in the rains extremely dangerous from several incurable landslips of quartz-debris from the northern steeps of the Lohakotee range. There are those to whom these bridges suggest the idea of the Manzanares, which should have

had a smaller bridge or a larger river ; for above half the year, owing to the heat of the valley, the route is forsaken by Europeans ; but is the main line of intercourse by means of the native traders between Almorah and Chilkiya, and that too in quite sufficient numbers to justify the outlay. Be that as it may, their picturesque effect on the scenery is undeniable ; while such works diffuse over the native mind, a most potent impression of European superiority. The first sight of the Buliya bridge near Bumouree, shaky enough, and much less handsome than those of Jiaree, excited shouts of admiration from a company of Golundaz, who witnessed with perfect indifference the view of the Snowy range from the Gagur Pass ; Nurayun was beaten on his own ground by the Company Buhadoor.

Beyond the Tipulee Dhoonga Bridge, there is a mile of steep narrow road, carried along a chloritic precipice beetling over the Kosilla ; this rock is exceedingly tough and occasioned much trouble. We now reach the Khyrna river flowing north from the Nynee Tal ranges and Eastern Gagur, in a wide stony channel, not a tithe of which is now occupied by its brisk clear current—the cold flowing waters that come from a far country—but which in the rains form a tremendous torrent, requiring a third suspension Bridge, 48 paces over, and generally known as the Munjera Bridge, from a neighbouring village, on the grounds of which we encamped : an exceedingly cold spot in winter from the shade of the adjacent mountains ; elevation 3000 feet, and severe hoar frost at night.

The left bank of the Khyrna consists here of iron-stone (red haematite) cliffs, which have been deeply mined in former days, but appear to be unwrought at present. A blue crystalline limestone occurs on the descent to the Jiaree Bridge, appearing also on the opposite side of the same mountain between Ramgurh and Peorah. Between the Jiaree and Tipulee Dhoonga bridges, dykes of syenitic granite and greenstone pierce and harden the quartzose strata along the right bank of the Kosilla, and appear to have tilted them into a vertical position ; this forms the nearest eruption of a granitic rock which we observed towards Nynee Tal.

Below the Jiaree defiles, the Kosilla meanders through a rather wide, cultivated valley, and finally escapes from the mountains by the Dhikolee Pass above Chilkiya. In the warm season this valley is uninhabitable, and in the wet season the river, which must be repeatedly passed, is unfordable : but during the cold weather, when the Gagur Passes are

shut by snow, it affords an easy, though circuitous route from Almorah to Chilkiya.

The vegetation from Jiaree towards Almorah consists of—

Rosa Brunonii : “Kooja.” } lowest limit,

Cerasus Puddum : “Pudm,” “Puya.” } 2500 feet: with *Crataegus*
Pyrus variolosa : “Mehul.” } *crenulata* : Surjoo Glen.

Hedera helix and *H. parasitica*.

Vitis lanata and *V. latifolia*.

Pittosporum eriocarpum :—“Gur-silung,” “Gur-shoona.”

Clematis Gauriana, *C. Buchananiana*, and *C. grata*.

Thalictrum foliolosum : “Pengla-juree,” “Chulnia:”—lowest limit 3000 feet.

Crotalaria sericea : *C. tetragona*, *C. alata*, *C. albida*, and *C. prostrata*: “Goongree.”

Bauhinia retusa : “Kandla,” “Kanulla.”

Bauhinia variegata : “Khweiral.” From 2000 to 6000 feet.

Bauhinia Vahlii : “Maloo,” “Maljhun:” the fibre of the bark affords a very strong and durable rope: hence the name from “mul,” to hold: or because the leaves are in general used to contain ghee, &c.

Erythrina stricta : “Roongura.”

Edwardsia mollis.

Dalbergia robusta, and *D. Ougeinensis*. The timber of the last, “Sannun,” is very durable, and much used for ploughs, furniture, &c.

Oxyramphis.

Desmodium? a shrub with hoary leaves and yellow flowers.

Acacia sirsisa? “Kulsees.” The bark is applied for hurts to the eye.

Acacia mollis : “Burou;” and *A. pennata*?

Mimosa rubricaulis : “Agla.”

Pueraria tuberosa. This fine climber is in profusion along the exterior belt of the Kumaon mountains, and is known by the names “Bilaee-kund,” “Billee,” “Biralee-pona.” Children are employed in digging up its enormous tubers, which are exported to the plains, being considered to possess very cooling properties. It seems to be Dr. Royle’s No. 71, in the List of *Materia Medica*, J. A. S. for October, 1832, and if so is identical also with his No. 78, “Sural,” and “Suralt,” being the names of *Pueraria* in Sirmour.

Jasminum pubescens, and *J. grandiflorum*.

- Nyctanthes arbor-tristis* : " Kooree," " Parijat."
- Glycosmis pentaphylla* : " Potula."
- Murraya exotica* : " Jootee." From 2000 to 4500 feet.
- Bergera Königii* : " Gunee."
- Sterculia (Wallichii?)* : " Bodula."
- Hibiscus Lampas* : " Kupusya."
- Grewia oppositifolia* : " Bhengool."
- Bombax malabaricum* : " Semul."
- Poivrea Roxburghii.*
- Terminalia Bellerica* : " Byhurah."
- Terminalia Chebula, " Hur :" " Hurura :" the fruit pulled while young is sold as " Jungee Hurura," and " Bedmata"—mother of doctors.
- Pentaptera tomentosa* : " Saj."
- Andrachne trifoliata* : " Korsa."
- Euphorbia pentagona* : " Seehoond."
- Phyllanthus Leucopyrus?** " Ainta :" and *P. Emblica*† " Amla."
- Briedelia montana* : " Kurgnulia."
- Adelia* : a beautiful shady tree resembling *Eugenia*, " Kandagar."
- Ricinus communis*. " Eend."
- Rottlera tinctoria*. " Rroonee" " Rolee." Meets *Andromeda ovalifolia* at 4000 feet. *Rottlera* is the tree called " Kamilla in the Simlah mountains ; and it is curious enough that Dr. Royle (as quoted above—No. 408,) gives Kunbeel, Kumbela as the Arabic terms for " the stri-gose pubescence of the fruit."

Captain Thomas (Views of Simlah, p. 4,) states that the seed of the " Kamilla" is a sure cure for the distemper in dogs, if given immediately on the appearance of the disease : no quantity is mentioned, a very necessary element in an Euphorbiaceous recipe.

Captain Thomas, however, is mistaken in affirming that heaths " in great variety and beauty, alike of form and colour" exist in the mountains : not one species that I am aware of has yet been discovered. Nor is it much more probable that " the elder is found in abundance all round Simlah." *Sambucus adnata*, indeed, grows on Gossainthan in Nepal, and on the mountains of Kashmeer, (Royle, Illus. 236,) but " Elder (*Sambucus*, not the *Alnus* or *Alder*) Bhekla" (Thomas, p. 9.) if the vernacular name be correct, denotes *Prinsepia utilis*, which yields oil, but not wine : its berries also ripen in spring. Captain Thomas'

* *Flueggea Leucopyrus?*

† *Emblica officinalis*.

"Elder" is probably Viburnum or Rhus: and, though a true holly be abundant, his "Mohroo" and "Kurshoo" are oaks.

Myrsine bifaria.

Saxifraga ciliata: "Silphora." (*The Stone-breaker.*)

Casearia Cheela: "Cheela," "Cheelara."

Marlea begonifolia.

Cornus macrophylla: "Kagsha."

-*Geranium bicolor* and *G. Nepalense*.

Oxalis corniculata: "Chulmoree."

Rumex hastatus: "Chulmora," Sorrel.

Rumex Nepalensis. Dock.

Bupleurum tenue.

Bidens Wallichiana: "Kutaree."

Oenothera lanuginosa: "Kupasee;" to Jiaree.

Leucomeris spectabilis: "Punwa."

Ammannia rotundifolia: "Durmeea."

Leucostemma angustifolium.

Leucostemma latifolium, at 6500—7000 feet on Budhan Benaik.

Lindenbergia ruderalis, and *L. grandiflora*.

Solanum indicum: "Kutung-karee."

Verbascum thapsus: "Ekulbeer."

Callicarpa incana: "Duya."

Gmelina arborea: "Kumbhar."

Holarrhena antidysenterica: "Kooer."

Holarrhena pubescens.

Wrightia mollissima: "Durhela"—"Dyhra."

Cryptolepis reticulata.

Vallaris dichotoma.

Ichnocarpus frutescens.

Carrissa Carandas. "Timookhia."

Barleria cristata.

Adhatoda Vasica: "Bashing."

Colebrookia oppositifolia: "Doolshut."

Pogostemon plectranthoides: "Roodra."

Scutellaria repens.

Hamiltonia azurea.

Ixora tomentosa.

} "Doodhee."

- Ficus Cunia** : "Kewnia."
- Ficus macrophylla** : "Timla."
- Ficus** : "Gur-timla."
- Ficus** : "Kewnia,"—"Kismira."
- Sponia** : "Khusuroa."
- Rhus Kakrasinghi** : "Kakur." 2000 to 5000 feet.
- Rhus parviflora** : "Runnel," "Rai-toong."
- Rhus velutina** : "Toong," "Amee," (from its mango fragrance.)
- Mangifera Indica**.
- Odina Wodier** : "Jinghun."
- Elaeodendron dichotomum** : "Shouria."
- Celastrus spinosus** : "Gwala-darim."
- Celastrus nutans** : "Malkagnee." The oil expressed from its seeds is highly valued in rheumatism.
- Rhamnus virgatus** : "Chudooa."
- Sageretia oppositifolia** : "Uglia." 2000 to 5000 feet.
- Gouania leptostachya** ? { "Kangnee ka bel." "Soobela :" a very common climber of the outer mountains from the Kalee to the Sutluj.
- Hiptage Madablota**, (i. e. Madhavi-luta.) "Aita-lugoola."
- Porana racemosa**, and **P. paniculata**.
- Ipomoea coerulea**, and **I. muricata**.
- Deeringia celosioides** : "Kalee-loaree" "Kulia-thoka."
- Ærua lanata**.
- Trichosanthes palmata** : "Indrayun."
- Kalanchoe varians** : "Noonoo."
- Asparagus adscendens** : "Khyrooa."
- Fritillaria Thomsoniana** : to Munurs.
- Cissampelos convolvulacea** : "Paree."
- Cocculus cordifolius** : "Goorcha."
- Berberis Asiatica** : "Kilmora." This bush descends to the upper limit of *Nauclea cordifolia*, *Moringa*, and *Acacia Catechu*—about 2500 feet. There can be little doubt it is the species described by Don and Roxburgh, but with pendulous racemes; and apparently identical with that which Dr. Royle calls *Berberis Lycium*, under the impression that it had been erroneously included in *B. aristata*. Dr. Royle inclines to identify his *B. Lycium* with *B. angustifolium*, Roxburgh; but Don

more correctly in my opinion, considers the last to be *B. aristata*—the “*Chotra*” of Kumaoon. Both species are extremely common all over the Province, from which it would appear that Roxburgh obtained his specimens. In the List of *Materia Medica* before alluded to Dr. Royle also mentions *B. asiatica* (No. 240,) as growing in the Hills. The etymology and the consent of the Pundits of Kumaoon proves that this, and not *Curcuma xanthorrhiza*, is the Sancrit “*Daroo-huridra*,” the Persian “*Dar-huld*” “*Yellow wood*,” of which *Rusot* (*S. Rusangjun*) is the extract. *Kushmul* is from *Kushayu*, *extract*, and *mull*, *having*.

Nasturtium officinale : “*Peeria*.” Abundant at Jiaree and Seetabun, as it is also in the streams at Pinjore, where it might be turned to some account for the troops at Kussowlee, &c. One is surprised to meet this, and other north of Europe plants, as *Ranunculus sceleratus*, *Veronica Anagallis*, &c. only at very inferior elevations in the mountains : they disappear between 4000 and 5000 feet : a circumstance which may be accounted for by the diminished pressure of the atmosphere, as hinted by Humboldt.

Adiantum capillus veneris and *A. rhizophorum*.

Eriophorum comosum : “*Babur*.”

December 8. To Nynee Tal, 12 or 14 miles, involving an ascent of 4475 feet, of which a considerable portion is steep and continuous to the Ulmah ka khan Pass, 7431 feet above Calcutta, according to the Trigonometrical Surveyors, but 200 feet less by the observations of Lieut. R. Strachey of the Engineers, whose determination of heights in this quarter will be marked by his initials.

Quitting the Kosilla at Munjera, and ascending for about two miles, the road diverges, one branch to the S. W. leading by the Gagur Fort on the Budhan Binaik, towards Chilkiya Mundee : this pass is about 7200 feet above the Sea, the encampment between Munjera and Kotah being at Mehula, an inconvenient spot a few hundred feet below the crest, southward ; the other branch proceeds due south to Nynee Tal. A more interesting, though somewhat difficult route follows the bed of the Khyrna, disclosing scenery wild and beautiful, with much of the character of the Sewalik Passes. At about three miles from the Khyrna Bridge, the Ramgar (Khynra) stream is left to the east, and a mile farther, the Ninglath or Shamkhet stream, in the same direction, the course of which is completely misrepresented in the Trigonometrical

Map. As much further on, where the river route meets the made road at an elevation of 3896 feet, (R. S.) the torrent again forks, the eastern branch rising in the Lurria Kanta Peak, and leading to Ulmah ka Khan ; that to the west has its sources in Cheenur mountain, and near Jak and Boodlakot villages, forms several fine cascades just visible from the road ; the greatest of them has a fall of 270 feet.

In the bed of the Khyrna, below this point, the *Datisca cannabina* (or *nepalensis*) grows luxuriantly : its bitter yellow roots are in some medicinal estimation under the names *Bujr-bhunga* and *Bhung-jala* (water-hemp). *Dalbergia robusta*, "Buro," is large and abundant hereabouts ; and between 6000—6500 feet occurs an undescribed *Ipomoea*, with small pink blossoms, which Mr. Edgeworth proposes to call *I. oxyphylla*. It is also found, I think, below Khathee, on the Pindur.

During the latter portion of the ascent to the Ulmah ka Khan (Ulra ka Khan in the Map) the mountain scenery becomes exceedingly grand and varied : to the right, and ahead, the vast summit and inaccessible steeps of Cheenur are feathered with cypress and oak ; to the left are Lurria Kanta and its spurs ; to the north, at a profound depth, is the bed of the torrent, blocked up with great boulders—and over and beyond it the long line of the snowy range. The forest on the road side consists for the most part of *Pinus longifolia* and *Quercus incana*, both of large dimensions. The Pass is named from a Rohilla invader who was slain here, or from a Devta of the same name ; both accounts are in vogue. From the crest, there is an abrupt descent of about 1100 feet to Nynee Tal, the upper end of which bears nearly south, distant one mile, in a horizontal line.

This now celebrated, but somewhat over-puffed lake, is a small tarn, extending from N. W. to S. E. about seven furlongs, with a maximum breadth of $2\frac{1}{2}$: the greatest depth about 80 feet. It is fed by a small rivulet from Cheenur ; and at the opposite or S. E. extremity, issues one of the sources of the Buliya river, which, flowing down a gentle and lovely valley of quite Italian scenery, joins the Goula above Bumouree. Through this glen a carriage road is perfectly feasible to within a couple of miles of the station, and its commencement has been authorized by the Honorable the Lieutenant-Governor, N. W. P.

The water of the lake is perfectly clear, and under the generality of the skyey influences, exhibits a blue which reminds one of a reach of

the upper Rhine, or Switzerland's smallest lake, Zug, which however, is much larger than Nynee Tal. Near the brink, the surface is matted with a tangled mass of *Potamogeton mucronatum*, *Myriophyllum indicum*, *Chara verticillata*, *Polygonum scabrinervium*, and the pretty English *Polygonum amphibium*, which here, and here only in India, so far as my experience goes, raises its pink spikes above the water. Where free from these, the surface reflects its splendid framework of mountain and wood like a mirror. Though only so recently known to European civilization, it is said to be described in the Skund Pooran under the appellation Trikhi or Tririkhi, "The Three Saints"—to whom must now be added a fourth, a Jewish Saint, "St. John in the wilderness," in whose name a very pretty Gothic church has been erected on one of the most picturesque sites in the settlement. A new temple of Devee adorns the exit of the lake, but St. John has put the "Three Saints" to flight, and the mountaineers generally consider the waters as polluted and desecrated by the beef of the butchers, and the skins of the bibishtees, who follow in the train of his votaries. The consequence is a sensible decline, and probable fall of the spring-fair held annually in honor of Devee, the lady of this Indian lake. The modern designation reminds us of the still more celebrated Nynee Devee, the patroness of the Sikhs, overlooking from her mountain shrine the Sodee town of Anundpoor Makhowal, where the Sutluj leaves the Himalaya; we have Beebee Nanee in the Bolan Pass; and James Prinsep would have evoked many a Nanaia and Anaitis from his coins and historians. Allowing a Persian origin to this form of the goddess, we perhaps have the etymology in *nan*, bread; in this instance, unhappily an exemplification of *lucus à non lucendo*, the bread of Nynee Tal being the worst in the world.

The lake is separated from the Plains to the S. W. by the rugged mountain of Uyarpata, so named from the predominance of the Andromeda in its woods, which also abound in admirable specimens of the green oak, *Quercus dilatata*. This mountain, as well as the low neck of Hanee Banee (*Echo*) which joins it to the lofty and precipitous peaks of Deoputa to the N. W., is almost exclusively formed of the transition limestone of Musooree, exhibiting everywhere vast rents, caverns, crags, and blocks, and falling so abruptly to the water, that till 1847 nothing beyond an indifferent path-way was attempted "the villainous salt-petre" is now at work on the rocks, and a wide road at the level of the

lake underlies half the mountain, which, when completed, will form a "Chukkur" of three to four miles, unrivalled in India. It must be acknowledged, nevertheless, that the sense of constraint and confinement is unpleasant and inevitable ; no view of the snows, or even of the surrounding sea of mountains is procurable at a less expenditure than a clamber of a thousand feet, except to the residents of the ridges, who acquire the privilege at the price of a daily descent to the lake, unless they choose to imitate the Hindoo ascetics and perform a solitary penance on their "aery citadels." In this respect, Nynee Tal is inferior to the other Hill stations ; its advantages consist in the exercise of boating, and, to those who have sufficient health and energy, in excursions to the many glens around, which to the sportsman, the draughtsman, and the naturalist, possess a richness of attraction undreamt of at Simlah. There is indeed one extensive tract less open to the above objection, the Ghiwalee Estate, the property of Captain Arnaud, lying to the south of Uyarpata, and comprising a series of swelling and beautifully wooded elevated lawns, which, to the south and S. W. terminate abruptly in a facade of magnificent precipices, from 1500 to 2000 feet high, from the bases of which issues the Nehal river, flowing to Kaleedhoongee and the Bhabur, a vast expanse of which, and of the Plains beyond, lies stretched below like a carpet. To the east, these cliffs are of clay slate, in the centre of limestone ; to the N. W. of slate again, distinctly stratified, and dipping from the plains. Here, as in the glen of the Buliya, the rocks appear to rest on beds of blue alum shale and white gypsum, which must be of immense thickness, as they accompany us nearly to the foot of the mountains, when the gypsum assumes the texture of alabaster. There is a strong chalybeate spring in the glen of the Buliya. We find this same gypsum in exactly analogous circumstances, (i. e. just outside the limestone,) at Suhusradhara in the Dehra Dhoon, and at Subathoo, under the limestone of Kurol ; and this limestone, which in the Lohakotee mountain becomes crystalline in contact with the micaceous rocks, exhibits precisely the same change at Jutog near Simlah : a proof that the geological phenomena of the Himalaya, though "a mighty maze," are "not without a plan." To the very brink of the Ghiwalee precipices, the woods are composed of oak, ash, maple, Siberian crab, cypress, and other northern forms, while the sward abounds, in the *Primula denticulata*, *Parnassia nubicola*, &c. : with Paeony at no

great distance. Immediately beneath is the semi-tropical vegetation of northern India. The cliffs are slowly wearing back, and many of these oaks, &c., must be carried down by the torrents to mingle with the Naucleas, Odinas, &c. below. Now let us only suppose that a deposit of coal was formed : what a trap to catch geologists, who would from its contents draw the fullest conclusions as to the anomalous climate which in former ages had permitted such incongruous materials to co-exist !

The limestone pinnacles of Deoputa are about 7800 feet high ; the rock is here greatly shattered, and a complete wilderness of blocks lie strewed below in the valley leading to Kaleedhoongee, resembling another Glengariff, and equally softened by a mantle of coppice. Deoputa declines N. E. to a gap, known as the Cheenur or Deoputa ka Khan, 7438 feet high (R. S.) and opening two routes by the savage glen of the Bukra (or Boula) river to Kotah. Beyond this, the ridge is continued in the same direction, till it merges into Cheenur, the broad-browed monarch of the Gagur, 8526 feet above the Sea, (R. S.) and 2,200 above the lake, from which it stands about a mile and a quarter horizontal distance, and to which it presents a rocky and shingly front so precipitous as to be inaccessible. The basis of the mountain is clay-slate, apparently dipping West or N. W. yielding excellent materials for roofing, like that of Ghiwalee : but the summit is capped with limestone, which also occurs on the acclivities facing the S. W.

On reaching the crest, as seen from the lake, it is found to run back towards the N. W. for perhaps 1200 yards as a level ridge, exactly in the line and direction of the lake's length. The summit is clothed with a brushwood of Indigofera, Spirea, Elsholzia, Salix ; Androsace lanuginosa covers the rocks ; Anemone discolor occurs in the shaded places ; and at the cairn of the Surveyors, grow a new *Stellaria* (*semivestita*, Edgw.) and the *Hemiphragma heterophyllum*. The Holly (*Ilex dipyrena*) reaches a great size : one measured near the ground was between 16 and 17 feet in girth : but the characteristic tree of Cheenur is the *Quercus semecarpifolia*, which fringes the crest, and covers the whole S. W. face ; Budhan Dhoora and Sat-choolium, points of nearly the same altitude, and at no great distance, on each side of Cheenur, have not a trace of it ; and on the former I could only find a few specimens of *Colquhounia vestita*, a very common shrub at Nynee Tal and towards Budreenath. The *Limonia laureola*, too, occurs only in this locality on

the Gagur range, so far as my researches extend ; and though the Cypress is said to exist in Dhyanee Rao, it appears to be in small quantity, limited to a grove or two ; the face of Cheenur towards the lake, on the contrary, bristles with groves and clumps of this dark and stately tree, which recurs, though in diminished numbers, on the Ghialee cliffs, as low down as 5100 feet. The vegetation of Cheenur and Nynee Tal thus presents some difficult problems, which the natives resolve at once by the assertion that the Oak, Cypress, Limonia, Colquhounia, &c., were imported from the snowy range and planted here by Devee herself : and one might really suspect that some of the fanatics who did penance on Cheenur in days of yore, actually introduced them from the holy *teerths* among the snows, were it at all probable that they would have condescended to such humble plants as the Hemiphragma and Anemone. Moreover, on this principle it might be surmised that Pilgrim put the Polygonum amphibium into the lake to make it more English !

The view from Cheenur embraces Rohilkund, Kumaon, Gurhwal and the Snowy range, from the sources of the Jumna to those of the Kalee. The great Himachul must be about 65 miles distant in a straight line, and its details are therefore less distinct than from Binsur and Almorah, whence the superior limit of forest is perfectly defined—much more so than the snow line—and above which the eye reposes with a never to be satiated curiosity on the enormous shelving masses of rock and snow which appear as if they would squeeze Mother Earth to a mummy. Here we have the Gungootree group running apparently north, with sloping, and apparently stratified planes to the east ; then comes the great Kedarnath mass, said to be the original Soomeroo, whence Siva regards with jealous rivalry his neighbour Vishnoo, who dwells over the way in the still grander mass of Budreenath, or rather on the Nurayun Purbut, the snowy cone above Budreenath Temple, which is perhaps the Naubandhana Peak, to which he is fabled to have moored the ark after the deluge. The base of the great square mass alluded to, was visited in 1847 by Major Sampson, who ascertained that the Vishnoogunga rises there to the west of Mana, from three separate glaciers, the Sutputee to the S. W. ; the Pabeeegurh, West ; and the Soopow, or principal glacier, to the N. W. The last comes down from a range called Punkwadanner, constituted, as shown by the boulder-debris, of normal grey granite, the existence of which in the great crest

had never before, I think, been observed. Much further to the S. E., with Binsur for our station, a good glass enables one to detect abreast of Moongsharee, amongst the western recesses of the Punch Choolla Group (the fabled abode of the Five Pandoos,) what will probably turn out to be one of the greatest glaciers of the Himalaya, well deserving the examination of any future traveller on the Milum route. (It is in good hands.)

Cheenur mountain is prolonged S. E. in the Boorans ka danda, "Rhododendron Range," a razor-edged spur, so narrow for several hundred yards as to try the nerves of the new-comer severely. The Uilmah ka Khan Pass divides it from the Sher ka Danda, "Tiger Range," a name which from sure indications, I should say was equally applicable to all; centuries must elapse before it becomes as insignificant as our own Wolverhamptons, Bearhamptons, &c. The Sher ka Danda forms the east and north-east boundary of the lake, to which it falls in the easiest and most regular slopes of the station; but on its east and S. E. aspects, the slate which composes it crops out in tremendous shelves and precipices, with landslips which have thrown serious difficulties in the construction of the Post road to Almorah, via Ramgar, which passes this way. A syce who was unlucky enough to fall over about two years ago had an escape as miraculous as that of the burgo-master of Bern, or the Mameluke of Cairo.

The culminating point of the Sher ka Danda throws off a ridge to the N. E. which in a mile or two ends in the Lurria or Lurooa Kanta, an enormous mountain, rivalling Cheenur in mass, and attaining the elevation of 8023 feet (R. S.); its summit is quartz, bold and craggy to the north. On this mountain and the Sher ka Danda, alone, is to be found in this quarter, the *Quercus lanuginosa*: "Reeanj."

Having now completed the circuit of the lake-mountains, it only remains to search whether any trace remains of the agency which upheaved them. To Mr. Batten is due the discovery of the only two dykes of greenstone which have hitherto been detected—but doubtless a more careful and extended examination will bring others to light. One of those already known commences near the north end of the Lake, and may be traced N. E. to the summit of the Sher ka Danda; the second is on the opposite side of the lake, between Uyarpata and Ghiwalee, passing through limestone and beds of hornstone. The trappean rocks are said to re-appear between Koorpaka and Kalaputhur, when they

derange and alter the other rocks as usual. I have in my possession a trilobite imbedded in limestone, discovered by my friend Major Sampson in the rubble platform on which Sirmouria, "the Swing village," is built, between the 4th and 5th milestones, on the descent to Kaleedhoongee—the first, and as yet the last fossil afforded by Kumaon; (Vide Plate—where it is drawn by Lt. R. S. of the natural size.)

Houses have rapidly sprung up over most part of the settlement; some towards the crest of the limitary ranges are nearly 7500 feet above the sea: even the rugged and woody Uyarpata is being gradually planted; but the favorite sites are on the undulating tract of forest land which stretches back from the head of the lake to the base of Cheenur and Deoputa; in the S. W. angle of this area, about 260 feet above Nynee Tal, is the Sookha Tal, dry except during the rains; between this and some fine limestone crags to the south, lies the road to Kaleedhoongee, which, after an easy rise, at one mile from the Bazar, quits the valley and descends rapidly to the plains, from the "Abelia" Pass, 6800 feet above the sea. Near the Sookha Tal there is a curious circular basin, with steep and exquisitely wooded banks, known as the Mulla Pokhur or Upper Pool; it has formerly perhaps been permanently submerged, but, at present, for the best part of the year, forms a damp rich meadow, decked with primulas and buttercups.

From its vicinity to the plains, Nynee Tal enjoys the full benefit of the "Dhoon Breeze," and, unless in the wet season, its temperature is delicious; then indeed, its weeping climate appears to resemble that of the west of Ireland and Scotland; more rain falls than at Mussooree, and twice as much as at Almorah; the last being screened by the Gagur Range, which arrests and condenses the clouds to an incredible degree, and bestows on the lake the first and principal squeeze of the sponge which comes charged with the vapor of the Indian Ocean. After these falls, one is deafened by the incessant and vociferous chirping of innumerable cicadas: (*Cicada pulchella.*)

"Cantu querulæ rumpent arbusta cicadæ."

During the live-long night, the Singor, a small whitish owl, (*Noctua cuculoides.*) repeats its monotonous double note at intervals of a few minutes—the Nightingale of Kumaon.

"As the wakeful bird

"Sings darkling, and, in shadiest covert hid,
"Tunes her nocturnal note."

These constitute the sum total of my entomological and ornithological knowledge of this locality ; the following catalogue comprises the more common plants.

Cupressus torulosa. The Cypress. "Soorye :" "Rai-sulla."

Pinus longifolia. The Pine. "Cheer :" "Sulla."

Fraxinus (Ornus) floribunda. The Ash. "Ungou."

Carpinus viminea. The Hornbeam. "Chumkhuruk."

Betula cylindrostachya, (or *nitida*.) "Puya-oodeesh," i. e. "cherry-alder," from its leaves : or "Chumbur-muya," which is properly the Elm, not observed here.

Alnus nepalensis or *obtusifolia*. "The Alder." The pundits call this tree "Ootees," the Public, "Oodees" or "Oodeesh," doubtless from *ood*, water, with reference to its usual place of growth. The bark is used in tanning, dyeing, and in the preparation of red ink. The Almorah pundits consider "Ootees" to be a distinct word from "Utees," *Aconitum heterophyllum* : but in Dr. H. H. Wilson's Dictionary, the two plants appear to be confounded under "Utvisha"—"a tree used in dying : it is of three kinds, white, red, and black," from *uti*, overcoming, *vish*, poison. Hence "Utvish," *antidote*. There can be little doubt that "Utees"—*Aconitum heterophyllum*, is the corruption of this, and that Dr. Wallich (quoted in Royle's Illustrations, p. 47,) was misinformed when he rendered "Utvisha" by "Summum venenum." "Uti" no doubt is often equivalent to "much ;" but neither of these botanists appears to have perceived the connection between *Utvisha* and *Utees*, though the uses to which the *Utees* is applied fully bear out Wilson's sense of "overcoming," and on my suggesting the correction to my Almorah friends, they acknowledged its justice. *Uti* is defined "much, beyond, over," and seems identical with the Greek preposition "anti," opposite, in place of :" falling in with the idea of *much* in Shakespeare's "vaulting ambition, which o'erleaps its self, and falls on the other side." *Oopuvisha*, a synonyme of *Utees*, from *oop*, reverse, and *vish* poison, confirms this view. *Aconitum ferox*, which is truly *summum venenum*, is never called *Utees*, but "mour" or "mahoor" (Hindee), probably from S. *mudhoorum*, "sweet," "Poison;" of which "meetha," the common bazar name, is a translation. *Vishwa*, implying a dye, seems to have been the original word compounded with *uti* in the name of the Aldar.

Quercus incana. Common oak. "Banj."

Quercus lanata : "Reeanj," "Ranj."

Quercus semecarpifolia : "Kurshoo," "Sanj."

Quercus dilatata : "Kilonj," "Tilonj," but often mistaken for the last.

Quercus annulata : "Phuliant," "Phuniat."

Acer oblongum : "Putunglia," "Putungulia."

Acer laevigatum and *A. cultratum*. Maple.

Symplocos paniculata : "Lodh."

Rhododendron arboreum : from 3500 to 10,000 feet. "Booroonsh," "Boorans." The pundits of Almorah affirm that this is the true "Bundhooka," "Bundhojeevuka" of their sacred books, applied elsewhere, but with manifest uncertainty, to *Ixora*, *Pentapetes*, *Pentaptera*: all red flowers; the word however merely implies that they were "bound" as garlands, a common practice in the mountains, especially with the rhododendron. The name in Nepal is "Gooras," evidently the Sanscrit "Goorashyu," a mountain *Peeloo* (Wilson), from *goor*, the saccharine fluid so abundant in the blossoms. The pundits can only say that Boorans, Booroonsh, are "bhakha;" if not mere variations of Goorashyu, they are probably from *vrindisht*, very beautiful or charming; from *vrishnashun* (*Embelia ribes*), Bull-destroying: cattle are said to be occasionally killed by eating the flowers and young leaves. So *Nerium odoratum* is called Huyumaruka, the Horse-killer; or, from *vrish*, to sprinkle, to rain (honey or flowers.) Humboldt (*Cosmos*) quotes this rhododendron as attaining a height of 20 feet: he might safely have doubled that; a specimen on Binsur is 13 feet in girth; one at Nynee Tal is reported to be 16. One, on Siyahee Devee is 14½ feet round at 5 from the ground.

Andromeda ovalifolia : "Uyar:" in Nepal "Ungiar," perhaps from the Sanscrit "unarogyukar," causing sickness: the young leaves being very poisonous to sheep and goats. The honey is also considered very deleterious.

Hydrocotyle hispida. (Mehula, Budhan Dhoora.)

Ilex dipyrena : Holly. The fruit has frequently three seeds.

Ilex serrata? "Gurshoon :" a superb tree in the vallies below Cheenur, to the S. W. and on Siyahee Devee near Almorah.

Prinsepia utilis : "Jhutela," "Dhutela."

Cerasus cornuta : "Jamuna."

Pyrus variolosa : "Mehul." Wild Pear: when black and rotten, the fruit becomes very sweet.

Pyrus baccata : "Gwala-mehul." Siberian crab, or a species very like it; it is Common here, and along the Shamkhet stream: but does not occur elsewhere that I am aware of, till we approach the Snowy range.

Crataegus crenulata : "Geengaroo." White-thorn.

Cotoneaster affinis : "Reounsh." "Rous."

Cotoneaster mycrophylla : "Gurree."

Photinia dubia : "Gur-mehul." "Soond."

Agrimonia nepalensis.

Potentilla nepalensis, and *P. splendens*.

Spiraea cuneifolia : "Jhar."

Rubus rotundifolius, *R. tiliaceus*, &c. "Heesaloo." Raspberry.

Fragaria indica, and *F. nubicola*.

Rosa Brunonii and *R. macrophylla*.

Limonia laureola : "Nehur;" "Goorl-puta." This is the shrub alluded to by Mr. Ogilby, in Royle's Illustrations, p. 71, where we read that the Musk Deer is "said to derive its peculiar odoriferous secretion from feeding on the Kastooree plant, a kind of ground-nut, which is strongly impregnated with the same pungent scent, and which the animal digs up with its long tusk!"

Deutzia staminea and *D. Brunoniana*.

Cornus macrophylla : "Kagshee."

Cornus oblonga, and *C. nervosa*?

Populus ciliata. The Poplar. "Chulnia," "Chounia," "Chan."
"Gur-peepul."

Coriaria nepalensis : "Mukola."

Ruta albiflora. Rue. "Oopunya-ghas."

Rhus vernicifera : "Bhuliou." "Goor-bhuliou."

Sabia campanulata.

Xanthoxylon hastile : "Teemoor."

Tetranthera pallens, cuiptala, and several other Laurinæ : "Kouwul."

Acacia mollis. The Pink Siris. "Burou."

Indigofera Dosua, and *I. pulchella* : "Sukena." The flowers of the last are eaten in times of dearth.

Desmodium elegans, *D. hexagonum*, and *D. parvifolium*.

Lotus corniculatus.

Falcatula (*Trigonella*) *pubescens*.

Argyrolobium roseum?

Astragalus sesbanoides.

Astragalus chlorostachys.

Astragalus leucocephalus.

Cytisus flaccida.

Primula denticulata.

Primula floribunda, and *P. speciosa*. Low vallies: the first down to 2500 or 3000 feet: the lowest *Primula* in the mountains.

Androsace lanuginosa, and *A. rotundifolia*.

Parnassia nubicola.

Saxifraga ciliata: "Silphora."

Sedum sinuatum, *S. adenotrichum*, *S. pyriforme?*

Paeonia Emodi. Discovered on Deoputa, by R. S.

Thalictrum radiatum, on trees.

Thalictrum foliolosum: "Peela-juree," "Yellow-root;" exported to the plains as "Momeeree," where a larger kind, called "Momeara" is said to be brought from Persia, &c. Dr. Royle inclines to believe *T. foliolosum* to be the male plant of *T. neurocarpum*; were it so, they would be truly diæcious, for the first flourishes from 3000 to 7000 feet, the second from 8000 to 10,000 feet above the sea, and flowers much later. But in fact the first, as noticed in Don's *Prodromus*, produces abundance of fertile flowers chiefly in July and August, with generally four carpels.

Thalictrum rupestre (provisionally,) a pretty species, not found N. W. of Kumaon, common on crags at from 6000 to 8000 feet elevation.

Delphinium pauciflorum: "Moonilla," Larkspur. The root is chewed on Sundays to cure toothache.

Aquilegia pubescens. Columbine.

Ranunculus latus, and *R. vitifolius*. Buttercup.

Clematis montana.

Clematis velutina: "Ghuntiali," i. e. *Row of Bells*.

Anemone rivularis, *A. vitifolia*, and *A. discolor*.

Epilobium brevifolium. Don, *E. laeve*, Royle.

Corydalis chœrophylloides.

Berberis aristata: "Chotra." Berberry. Perhaps from S. Chitr pointed, variegated, alluding to the leaves; or kshi, kshut, chrut, to hurt, wound, tear.

} On Limestone.

Hedera helix. Yellow-berried ivy. "Banda."

Cissus capreolata : "Punj-puta."

Ampelopsis Himalayana : "Chuhpara." "Chuppur-tung."

Lonicera diversifolia : "Bhut-kookra." "Cheraya-koormalee." Fly Honeysuckle.

Viburnum cotinifolium : "Gweea."

Viburnum mullaha : "Tit-muliya."

Viburnum cylindricum : "Kala Tit-muliya."

Kohautia coccinea : "Busooliya-ghas."

Rubia cordifolia : "Mujethee." Madder.

Galium latifolium, *G. asperifolium*, &c. "Kooree."

Hamiltonia lanceolata : "Pudera."

Abelia triflora : "Moonree."

Jasminum dispermum : "Soormalee."

Jasminum chrysanthemoides.

Jasminum grandiflorum : "Jahee." Very abundant chiefly in the low allies towards the plains ; but also on Binsur up to 8000 feet.

Daphne cannabina : "Set-burwa :" both the white and purple flowering varieties.

Daphne sericea, (*Wikstroemia salicifolia* of Jacquemont,) "Chumlia."

The Nepal paper is made from this and the *purple D. cannabina*.

Evonymus japonica.

Evonymus tingens : "Koongkoo :" i. e. smut or mildew.

Lychnis fimbriata.

Geranium lucidum, *G. nepalense*, *G. Wallichianum*.

Impatiens amphorata, *S. cristata* : "Booree-ka-til."

Impatiens Balsamina. (Boodlakot,) used as a dye, and hence called "Mujethee" or Madder.

Oxalis corniculata : "Chulmoree," or "Little sorrel."

Rhamnus virgatus : "Chudooa," Satin Thorn.

Rhamnus purpureus, and *R. procumbens*. The last on limestone.

Euphorbia involucrata.

Sarcococca nepalensis.

Myrsine bifaria. The so-called Box.

Myrsine semiserrata.

Myrsine acuminata : "Choopra."

Plantago lanceolata, and *P. major* : "Loohooria."

- Polygonum amplexicaule*, *P. punctatum*, *P. scabrinervium*, *P. amphibium*, *P. nepalense*, *P. Indicum*, and *P. recumbens*.
- Viola serpens* and *V. reniformis*.
- Elsholtzia polystachya* : "Bhungureea." The so-called Lavender.
- Elsholtzia strobilifera*.
- Teucrium quadrifarium*.
- Salvia lanata* : "Gunnia." Sage.
- Salvia glutinosa*.
- Origanum normale* : "Bun-toolsee."
- Plectranthus Coetsa*, *P. patula*, *P. hispida*, *P. Gerardiana*.
- Ajuga decumbens* (or *parviflora*?)
- Nepeta leucophylla* and *elliptica* : Catmint.
- Leonurus sibiricus*.
- Stachys sericea*.
- Lamium petiolatum*.
- Prunella vulgaris*.
- Melissa umbrosa*. (*M. flava*, on Binsur.)
- Colquhounia vestita* : "Bhilmora," "Bhermora," common also below Mularee and Budreenath, where it is called "Ungeeria."
- Begonia picta* and *B. dioica*.
- Chirita bifolia* and *C. Edgeworthii* : "Sunkh-pooshpa."
- Platystemma violoides*. Rock violet.
- Scrophularia polyantha* ?
- Hemiphragma heterophyllum*.
- Pedicularis elegans* and *P. carnosa*.
- Cynoglossum canescens*, *C. glochidiatum*, and *C. furcatum* : commonly called "Forget-me-not."
- Dicliptera bupleuroides*.
- Strobilanthes attenuata*.
- Strobilanthes glutinosa*—"Kupoor-nulee."
- Aster bellidifolia* : "Murch-mool."
- Inula asperrima*.
- Serratula pallida*.
- Ainsliea aptera*, and *A. pteropoda*.
- Onoseris lanuginosa* : "Kupasee," affords the tinder called "Kufee."
- Antennaria cinnamomea*, and *A. triplinervis*. All known as "Jhoola".
- Antennaria semidecurrens*. } and "Bokula;" the to-

Anaphalis decurrens. }
Gnaphalium multiceps. } mentum of the leaves and branches is
 much used for tinder and moxa.

Myriactis oleosa, and *M. nepalensis*.

Solidago nepalensis.

Senecio canescens.

Senecio Jacobaea? *rapanifolia*? generally considered to be *S. Jacobaea*: but in habit and site (shady woods) very different. The leaves are often of a fine purple-copper below.

Amphiraphis rubricaulis.

Conzya pinnatifida.

Calimeris flexuosa.

Artemisia indica, &c. "Patee." Wormwood.

Bidens bipinnata, and *Wallichiana*.

Siegesbeckia orientalis.

Carpesium.

Echinops nivea: "Kunyla." "Jou-kanda." Globe Thistle.

Echenais arachnoidea. N. S. Edgw., "Thunyla." White Thistle: 6000—8000 feet.

Mulgedium macrorhizum, and *M. robustum*.

Leontodon taraxacum, and *L. eriopus*.

Tragopogon elegans.

Morina Wallichiana.

Scabiosa Candoliana: "Nara."

Valeriana Hardwickii: "Shumeo." Perhaps *S. shumi*, from shum, to calm.

Gentiana marginata.

Ophelia paniculata.

Ophelia angustifolia.

Ophelia purpurascens.

Ophelia cordata.

Campanula pallida, and *C. ramulosa*.

Lobelia pyramidalis: "Kokilia." Glens, S. W. of Cheenur.

Marsdenia lucida: (Edgeworth :) a large climber over rocks and trees, at 7000—7500 feet, in the shadiest recesses of Uyarpata, Siyahée Devee and Binsur. Its beautiful evergreen foliage and sweet purple blossoms would make it a favorite in English shrubberies in preference to *Periploca graeca*. The only name is "Doodhee."

} Cherayuta.

Marsdenia Roylei: "Moorkeela." The fibre affords excellent fishing lines.

Ceropegia Wallichii.

Roscoea purpurea, *R. alpina*, *R. lutea*.

Hedychium spicatum: "Kuchoor-Kuchree."

Liriope (*Ophiopogon*) *intermedia*, and *L. spicata*. "White hyacinth."

Lilium nepalense, and *L. Wallichianum*.

Allium leptophyllum: "Peeria-luhsun"

Allium lilacinum: "Puderia-luhsun."

Allium ellipticum: "Sheeolia-luhsun."

Asparagus adscendens. "Khyroor."

Polygonatum verticillatum.

Cyanotis barbata.

Commelynna obliqua: "Kana." Khunjura."

Satyrium nepalense: "Pukwa." "Dheemnee."

Habenaria intermedia, *H. pectinata*, *H. arcuata*

Aceras angustifolia.

Spiranthes amœna.

Davallia elegans.

Pleopeltis nuda.

Polypodium vulgare, *P. quercifolium*, &c.

Pteris normalis, *P. cretica*, &c.

Asplenium tenuifolium.

Aspidium squarrosum.

Adiantum venustum. Maiden-hair.

Arundinaria falcata: "Vingala." Hill Bamboo.

Erianthus olivaceus. Woods, Uyarpata; "Plume-grass."

Erianthus—: ditto—up to 7500 feet.

Juncus elegans. Carex indica.

Cymbopogon: "Peeria." Common aromatic tufty grass, from 4000 to 8000 feet: refused by cattle.

Andropogon calamus aromaticus: "Boojura." Cattle will not touch it while they can get anything else.

Rhaphis Roylei. "Salim :" covers all the more shaded parts of the higher mountains, and though very useful for thatch is too coarse for cattle: Nynee Tal is thus badly off for pasturage. A species of *Trisetum* occupies the sunny crest of Cheenur.

The Magnolia, which was supposed to grow at Nynee Tal, does not exist : the dioecious tree that was mistaken for it, is probably, Mr. Edgeworth informs me, what Dr. Lindley has described under the name *Gyrandra laurina* ; it is not uncommon in damp vallies in outer Kumaoon at from 6000 to 7000 feet, and is known to the natives as the " Rukt-Chundun"—the red-heart wood, being used like the Sandal, to mark the teeka on their foreheads.

December 12. From Nynee Tal to Kaleedhoongee, 12 miles, with 5700 feet descent. On quitting the basin of the lake by " the Abelia Pass," the road descends rapidly by the " Glengariff Dell," choked, as before mentioned, by a labyrinth of limestone masses from Deoputa : at 2 miles, pass the Surria Tal, a swampy basin, 5625 feet above the sea (R. S.) and at 3 miles, the Koorpaka or Koorpa Tal, a pretty circular tarn in the region of *Pinus longifolia*, 4931 feet (R. S.) the Ghilwalee cliffs are seen to great advantage from this point. Still lower 3771 feet, (R. S.) we pass Sirmouria, the " Swing" village, so called from one of the gallows-like frames on which the hill men amuse themselves during their festivals ; the vegetation here begins to assume a decidedly tropical aspect. Near the 6th milestone is Kala-putthur, a halting-place which has its name from a boulder of dark limestone, 2571 feet above the sea (R. S.) The road now becomes comparatively level, along the broad shingly bed of the Nihal, at present carrying but a small stream, which a little lower down, is entirely absorbed by the gravel and sand. The water is charged with lime, which is described as so cementing, at particular seasons, the floor of its channel, as to form for itself an impermeable trough, which carries it on much farther, than when a larger and more violent volume of water descends and breaks up the crust. An attempt was made to carry a causeway along this bed of shingle down to Kaleedhoongee : but " Leviathan is not so tamed :" the torrent breached, and finally annihilated the work during the rainy season of 1847, as every one predicted it would, except the public-spirited, but too sanguine projector. The mountains, richly wooded, and composed of marls and sandstone, may be said to be left at Kala-putthur, though their ultimate branches hug the right bank of the Nihal to within 2 or 3 miles of Kaleedhoongee, when the road enters the forest. This, excepting the Kaleedhoongee clearing of about two miles in length, is continuous 8 or 9 miles on to Boorhenee

on the Moradabad route, where the swamps and prairies commence, terminating about 20 miles from Kaleedhoongee, at the village Manpoor, near the left bank of the Kossilla. The Bhabura staging Bungalow is near Manpoor, but is in bad repair, and the climate is unhealthy till the middle of October or later : Durial, on the opposite bank of the Kossilla, is considered safe.

The Bazar at Kaleedhoongee is neatly built, and being now crammed with supplies for the use of the 31st Regiment on its march from Almorah, appears more like Mark Lane than a poor hamlet in the "Belt of Death." It stands in the angle between the Nihal and the Boula torrents—the latter, from the Kotah Dhoon, once infamous for the stoppage of travellers and the Post, is now permanently bridged.

The elevation of Kaleedhoongee is about 1100 feet above the sea ; the name implies "black stones," but refers to a site nearer the mountains. The vicinity of the public Bungalow is shaded by magnificent specimens of the "Hulloo," *Nauclea cordifolia*. This tree is the glory of the Kumaon and Gurhwal Bhabur ; fortunately its wood is of no great value, and is chiefly employed in making up opium chests ; and writing tablets ; it thus escapes the axe of the feller. From its yellow color, one would refer the etymology to *Huldee* ; but Wilson gives the Sanscrit from *huri*, a monkey, *droo*, to go : reminding us of Baron Hugel's observation cited in Kosmos, that in Kashmeer the large white ape with the black face *inhabits* the Chestnut trees. These restless creatures cannot well be said to inhabit any particular tree, frequenting those indifferently on which they feed. At Kotah, I noticed them greedily devouring the iron-like pulse afforded by the Siris, *Acacia speciosa*, a meal implying most potent gastric juice.

Between Nynee Tal and Kala-putthur, the most usual trees, &c. are *Ceanothus flavescens* : "Ghant."

Olea glandulifera (or *compacta*) : "Gyr." "Gulloo." "Guroor :" 2000 to 4500 feet.

Pittosporum eriocarpum : "Meda-toomree." "Gur-silung."

Hamiltonia lanceolata, and *H. cærulea* : "Pudera."

Wendlandia cinerea : "Choulaee." "Cheela." "Chilkiya." "Teela."

Clerodendron odoratum : "Monee."

Bæobotrys indica : "Kulsees?" From 2000 to 5000 feet.

Itea nutans : "Gurkath."

Leucomeris spectabilis : "Punwa." "Pundooa." Common between 3000 and 4000 feet; rarely up to 6000.

Engelhardtia Colebrookiana : "Moua." "Gobur-moua." "Bodul-moua."

Conocarpus latifolia : "Bakla." "Baklee." Its leaves are exported to the Plains for the use of the tanners; the timber, under the name of *Dhau* is considered excellent in Rajpootana, but seems in small request here. The Sanscrit *Vukoola* is applied in Bengal to *Mimusops elengi*. The *Conocarpus* imparts a fine copper tint to the forests in winter.

Erythrina suberosa, and *E. stricta* : "Roongura." Dr. Royle seems to consider the *Erythrina* of the Dehra Dhoon to be *E. spathacia*: the commonest species of similar localities in Kumaon agrees best with *E. suberosa*.

Bauhinia variegata, var. *candida* : "Khwyral." Abundant in all the warm glen below Nynee Tal, and from the Kosilla to the Kalee, flowering in April. It does not appear to extend as far as Mussooree, the "Khyrwal" of Gurhwal being *B. purpurea*; nor apparently south towards Silhet, for Roxburgh had only found it in gardens. "Khyrwal" is evidently the Sanscrit *Khurvullica*, "sharp or sour pedicel:" the flower-buds being made into pickle. *B. variegata* is the S. Kovidar, and Dr. Royle's kobdar, Illus. p. 185.

Acacia — ? "Kureo," an immense tree with white bark.

Oxiramphis sericea, (mihi.)

Lindenbergia macrostachya.

Ophelia angustifolia.

Lantana dubia.

Cuscuta grandiflora : "Akash-lugoolee."

Porana paniculata.

Holmskioldia sanguinea.

Barleria cristata.

Lepidagathis cuspidata.

Sterculia Wallichii ? "Bodula."

Zingiber ligulatum.

Costus speciosus : "Keoo." "Keolee." It is curious enough that the Sanscrit names *Kushmeer*, *Kushmeerju*, of the true *Costus*, the

"Koot" and "Puchuk" of commerce, (*Aucklandia Costus*) point out the country where Dr. Falconer discovered it, beyond which, it is not known to exist.

Saccolabium guttatum.

Vanda cristata.

Cælogyne nitida.

Pholidota articulata. All and others generally known as "Banda;" and, especially the last, by the doctrine of signatures, in much estimation as "Hurjoj" and "Hurjor" for uniting broken bones : though probably quite inert.

From Kalaputthur to Kaleedhoongee occur,—

Nauclea cordifolia : "Hulloo."

Nauclea parvifolia : "Phulloo."

Bignonia (Calosanthes) indica : "Phurkuth."

Bignonia suaveolens : "Padul." "Pudeeala."

Odina Wodier : "Jinghun." "Jeebun."

Sterculia villosa : "Oodial," a strong rope is obtained from the fibres of its bark

Capparis horrida : "Oolta-kanta." "Bipooa-kanta."

Capparis sepiaria.

Polanisia viscosa.

Ehretia levis : "Kodah."

Orthanthera viminea : "Chupkeea."

Calotropis gigantea : "Ak." Both white and purple.

Pergularia pallida? "Soorkeela."

Ventilago maderaspatana.

Vitis latifolia.

Artocarpus lacucha : "Dhou" "Duhoo." But apparently only near the clearings.

December 14.—To Kotah, six coss N. W. The low range of hills which beyond the Ganges is called the Sewalik, commences about three miles to the N. W. of Kaleedhoongee, and forms the Kotah Dhoon. The Boula, Bola, or Bol river, a large brisk stream, which rises on the S. W. face of Cheenur, waters its eastern portion copiously, and issues by its S. E. angle to join the Nihal below Kaleedhoongee. In this angle, Mr. Batten informs me that a hot spring exists, an interesting phenomenon in such a locality, which escaped my notice. The route

to Kotah, a mere pathway, lies for about six miles through dense forest, frequently crossing the stream : and then over the cultivated lands of three clearings and settlements of the mountaineers, Huldoobujoonia, Putulia, and Gintee. A little beyond the last are three large mango topees, called the Okulee, Sheenath, and Bhurutgiri *Bageechas*, in the first of which, covering 25 acres, is the usual encamping ground, by the high road from Tiaree to Chilkiya. The elevation is probably 2000 feet or more above the sea. Immediately north, and perhaps 100 feet below the road, is the channel of the Dubka river, about a mile over partly cultivated, but chiefly given up to thorny jungle and shingle. Three distinct terraces are traceable in this channel, formed by the river at various epochs : the main and highest bank, of boulders and gravel, has been scooped out into a flat curve. Along this plateau proceeds the road to Polgurh, where the river has forced its way through the low ranges into the Plains : the land in this (S. W.) direction is beautifully cultivated for two or three miles, irrigated by *Kools* from the Dubka, which is totally exhausted in the valley—being a very useful servant, though a bad master. It carries off the drainage of a great extent of lofty mountains, and the size and number of the boulders in its bed fully confirm what the people tell of its volume and violence in the wet season ; the attempt to cross is then frequently fatal, and hence the name, from *dubna*, to overwhelm.

The village of Kotah is a miserable place about three miles above the Okulee *Bagh*, on the opposite bank of the river where it emerges from the mountains by one of the most magnificent gorges in the world. The course of the stream is here diverted by a bluff, on which are the ruins of Kotah Gurhee, defended by thick stone walls, wooded precipices, and cut off from the cultivated ground to the S. W. by a narrow but deep ditch. The position is good, but so unhealthy in the rainy season, that the Gorkhalee garrison, consisting of one company, was forced to retire to Dola, another fortified post on a lofty mountain behind.

On the same bank, but lower down, and nearly opposite the Okulee Bagh, is the romantic temple of Deveepoor, about 200 feet above the river, on a low range of woody hills, here carved into a ridge by a confluent stream which pours down a narrow, but wild and lovely dell from the north ; in this paradise a man was killed by a tiger about six

days since. The temple commands beautiful views of the mountains, the outer ranges, and the Dhoon, all, except the few clearings, enveloped in forest. About a quarter of a mile east of the temple, I was surprised to come on a mansion and petty settlement, closely hemmed in by the wilderness, the present residence of Purmen Singh, uncle of the (by courtesy) Almorah Raja ; he has some villages at Kasheepoor, but came to this "sacred storehouse of his predecessors," to supplicate the goddess, and to shoot, with small success in either object, being laid up with fever.

To the east of Kotah the Gagur presents a group of three lofty peaks, probably 8000 feet high, separated from Cheenur by the *col*, Pungoot or Punota ka khet, about 7000 feet high, where the Boodlaket villagers raise some wheat, nominally for their own use, but really for that of the Jurao, Ghoorul, and other deer which swarm in the woods and rocks. Immediately N. W. of the three Kotah Peaks is the Budhan Binaik : then the Budhan Dhoora, 8500 feet high, where the Gagur turns west to Souchulia, a point of similar altitude, with a Trigonometrical Chubootra, determined to be 8526 feet, due N. of Putulia ; and terminates in the huge rounded, rocky summit, known as the Devec ka Dhoonga and Bahmunee ka Danda. This, which will probably turn out the highest point of the range, is marked by a *barrow* in the great map, and radiates in every direction : one branch descends west to Dhikolee, another south to Dola and Kotah forts. The Kotah Peaks send off to the S. W. a great spur called the Kureel ka Danda, on a point of which above the Dhoon is a *murhee* or cairn, sacred to Teet Devee. All the waters between Bahmunee Danda and the Kotah Peaks unite to form the Dubka, as the Kureel and Dola spurs do the Kotah Pass ; up this lies the high road to Almorah, through a glen remarkable for its extremely wild and savage scenery : for many miles there is not a vestige of cultivation, or indeed any space for it : nothing but steep and dense forest, or extensive landslips, which occasion many a wearisome ascent in what would otherwise be a gradual rise. Before this road was constructed, it is difficult to imagine how it was traversed : yet the fort at its base (Kotah) and another (the Gagur Fort of the map about 200 yards N. W. of the summit) imply that then, as now, it was greatly frequented and carefully guarded. The crest is the most level of all the Gagur Passes ; and is known as the Budhan Binaik, or simply

Binaik. Dr. Wilson gives us as the signification of "Vinayuk," "an obstacle," &c.: but as modernized in Kumaon, the import is that of "a Pass," originally perhaps defended by entrenchments, and therefore equivalent to "a Barrier."

The rock at and above Kotah Gurhee is the usual sandstone; above this is limestone: the three Kotah Peaks seem chiefly quartzose rock, and Budhan Dhoora, the same mixed with slate, dipping N. E. as usual; an eruption of greenstone occurs at Sour village on its southern declivity.

The vegetation of the Kotah Pass differs little from that of analogous localities; about half way up, at Sut-dhoonga, the rocks and trees are covered with graceful festoons of *Hoya lanceolata* or *pendula*: and every where the damper and shadier recesses are overgrown by the beautiful reed-like "Ounsa," *Thysanolaena agrostis* (*Agrostis maxima*, Roxb.) of which the leaves are considered excellent fodder for cattle. This plant, which penetrates by the vallies to the base of the snowy range, disappears at Almorah. *Grewia hirsuta* (W. and A.) occurs below Sut-dhoonga.

Jatropha curcas: "sufed Eend," is common about Kotah, and generally along the base of the mountains.

The forest in the Dhoon is generally constituted of—

Schleichera trijuga: "Koosum." "Gousum," yields an edible fruit, and a hard, heavy red timber, much used in sugar-mills, &c.

Falconeria insignis: "Khinna." "Kheena." 40 to 50 feet high: it is found in the mountains up to 5500 feet, reduced to about one fourth the height, and universally killed to the ground in the winter of 1846-47. The acrid milky sap is said to be poisonous, and very dangerous to the eyesight, like Khirnee (*Mimusops Kauki*, the name is probably derived from this milk, (Ksheer.)

Bassia latifolia: "Muhooa."

Alstonia scholaris: "Chhatiyoon" and "Sutiyoona." Nowhere uncommon in the Kumaon Bhabur: I have met it near Khuruk in the Dehra Dhoon.

Diospyrus lancifolia: "Urdinia :" extends to 3500 feet on the outer range.

Cocculus laurifolius: "Tilbura;" often confounded with "Kir-kiria" and "Kikra," *Cinnamomum albiflorum*.

Smilax macrophylla: "Kukurdar."

Syzygium Jambolana : "Jamun." "Phounda." The fruit is that of Roxburgh's *Eugenia Jambolana* : the leaves, those of *E. caryophyllifolia*.

Syzygium ——— : "Rae-jamun;" a very large, distinct, and handsome species, still more abundant in the forests of the eastern Bhabur : unknown in those of Gurhwal.

Vitis latifolia : "Pun-lugoola." "Bhyns-umlee." An immense climber, with cable-like stems, sometimes 2 feet in diameter. The first name imports "water-climber;" probably it is one of the species which in spring afford large supplies of sap.

Vitis tomentosa : "Chuppurtung." "Cheprain." "Ameela;" very common, and reaching up to 6000 feet in the mountains : Dr. Royle traces this species up to Monghir only : in Kumaon the leaf is always trifoliate.

Hymenodycction (excelsum?) "Bhoulun." "Bhulena" "Bhu-meena." "Dhoulee," an enormous deciduous tree. Towards the Sutluj, this or an allied species is, under the name of "Burtoo," in much request for sword scabbards.

Ficus oppositifolia : "Totmeela."

Ficus cunia : "Kewnia;" (hence the trivial name;) the "Jurphul" of Gurhwal : it occurs from the lower border of the grass tarai up to 4500 and 5000 feet in the mountains.

Ficus cordifolia? "Gujeeoon." "Gujeena." Much resembles the Peepul, as well as the "Pilkun" of Gurhwal (*F. venosa*?) if indeed it be different from the last. The Gujeeon is found up to 4000 feet in the mountains, and is frequently parasitical on large trees, the trunks of which are enveloped in a white network composed of its innumerable roots, and finally destroyed by them. The Gujeeon then consolidates into a stem "deeply furrowed, as if composed of many coalesced trunks." (Roxb.)

Ficus indica : "Bur," (i. e. best or greatest,) and "But," (i. e. *Vut*, to tie, its hanging roots being still used as ropes in Dinajpoor, Buchanan.) This tree does not ascend the mountains : it is considered sacred, and its root-stems, which from their toughness and elasticity make excellent poles for dandees, &c., are not cut till the in-dwelling, arborescent god has been appeased by the sacrifice of a goat—that luckless beast which on every occasion bears the brunt of the sins, real and imaginary, of all Kumaon.

Ficus religiosa : "Peepul," from *pa*, to preserve ; the practice of all India bears out the etymology ; not even a sacrifice atones for the crime of wounding and maiming it, and fortunately the wood is useless. This noble tree, abundant in the forests of the Bhabur, is planted as an exotic by the temples at Almorah, where it is sorely nipped in severe winters. It is worshipped on Saturday with "geetgan" (hymns) and the "purkuma" (prukruma) or great circuit, performed by parties of women. It is "the Tree of Knowledge," Bodhidrooma of the Hindoo mythology ; or simply "Bodhi," intellect, knowledge. Hence the famous Bo-tree of the Buddhists. It is perhaps fanciful to connect "Bo" and "Bur" with the Bo-tree or Bour-tree (elder) of western Scotland, with which many superstitious notions are associated : and still more so to conjecture that the islands Arran, Bute, &c. derived their names from the worship of Buddh, established in that far-west by the messengers of king Piyadasa, the spiritual father of all missionaries.

Sanskrit synomyms for the Peepul are "Nagbundhoo," "liked by elephants;" "Koonjurashun," "food of elephants;" also "Gujashun," and "Gujbhukshuk," to the same effect : which is so true that the spots selected for pitfalls are, if possible, near this or the Bur. Munaka, S., for an elephant, is from *mun*, to think, to understand ; and Locke avows his opinion that "dogs and elephants give all the demonstrative of thinking imaginable, except only telling us that they do so." (Essay, B. II.) The Hindoos have deified the sagacity of the elephant in Gunes, and perhaps supposed that it was attained by feeding on these trees. Here is a *rational* origin of the Tree of Knowledge—only permitted, however, to a German Professor ! Milton ventures to affirm that the paradaisaical Fig was no other than *Ficus indica*, and that its leaves formed the first clothing of our first parents ; a moral and poetical retribution if the Banian tree may also be considered a tree of knowledge : "the Brâhmans," says Roxburgh, "are partial to the leaves of this tree to make their plates to eat off ; they are jointed together by inkles." Hence if existing eastern names and notions are to be our guides in interpreting the records of oriental antiquity, after the method of Burder and many others, we must realize the Tree of Life—the Shurut-ul-hyat—in *Cupressus sempervirens* ; and the Tree of Knowledge—Bodhidrooma, in *Ficus religiosa* or *F. indica*, while

a new interest is thrown on the plains of Hindooostan by their identification with the seat of the terrestrial Paradise, "Eastward in Eden." The conquests of Cyrus would carry the Mythus into the western hemisphere.* Pliny, stating that the fruit of *F. indica* is rare, and not above the size of a bean, adds, "sed per folia solibus cactus præ dulci sapore, dignus miraculo arboris." One of the Sanscrit names is *Vrikshadun*, Food-tree.

Abrus: a pretty climbing species, perhaps the *pulchellus* of Wallich, is abundant in the hedges about Kotah, and in the mouth of the Pass: it is called "Luggolee Imlee," "climbing Tamarind," and is, I think, confined to this neighbourhood.

Mimosa pudica: "Lajuwuntec." The sensitive plant is completely naturalized, and grows everywhere about this part of the Kotah Dhoon.

Saurauja nepalensis. Vallyes at 3000—4000 feet.

Pladera virgata: (by Kools.)

Ipomea pilosa, and *I. hirsuta*. (Bed of the Dubka.)

* In an analysis of the Pudma Puran, given in the Journal As. Soc. for 1842, No. 131, pp. 1129, 1130, we have a further and very curious illustration of this subject conceived in the spirit of indelicacy and piety so familiar to the Hindoo mind:

"It came to pass that the wives of the Tripoorasors were dancing round the Uswuttha (Peepul) which is the king of trees, and endeavouring to obtain the fruit which hung from its lofty branches. Vishnoo, assuming the form of a priest, told them that they would not be able to procure the fruit unless they danced round the tree naked. On their obeying his injunction, Vishnoo, pervading the tree as he pervades all things in heaven and earth, shook it with a noise like thunder: the women, being frightened, clung naked round the tree, which immediately assumed the form of a naked young man, in whose embraces they enjoyed the fruit of their desires, but lost that virtue which gave immortality to their husbands."

On a former occasion the suggestion was ventured that Peepul and *Populus* are the same word: "Gur-peepul" is an usual name of *P. ciliata* in Kumaon: and it is evident the received etymologies of *Populus* are forced and uncertain. Bullet (*Arboretum Britannicum*) thinks it was so called from the motion of the leaves resembling the acts and thoughts of a free and enlightened but fickle populace: others that it arose from the circumstance that the public places at Rome were planted with this tree, hence called *arbor populi*, as the Spanish Alameda is from alamo, for the same reason. But why did the Romans select the Poplar? May it not have been from some lingering association brought by their ancestors from the east: their language is full of Sanscrit forms and terms: why should not Sancrit ideas have been imported with them, and the Poplar chosen as the best representative of the Peepul? The latter is sacred to Vishnoo, the sun: and we find the former connected with the legend of Phaethon, whose sisters, the daughters of the sun, were metamorphosed into Poplars.

Verbena officinalis.

Bidens Wallichiana.

Hamiltonia azurea.

Scutellaria repens.

Shuteria involucrata.

Triumfetta oblongata.

Abutilon oxyphyllum.

Leea Sambucina.

Cheilanthes dealbata.

Adiantum Capillus Veneris.

Adiantum rhizophorum.

Lygodium japonicum : about the Kotah Bagheechu.

Hibiscus cannabinus, "Sun," is cultivated to a small extent in the fields about Kotah : *Crotalaria tetragona* is wild : but the "Sunai" *Crotalaria juncea*, appears to be unknown.

December 15.—To Seetabun, about 6 miles W. S. W. The route crosses the Dubka, of which the right bank is high and precipitous ; the broad stony valley is tangled with *Acacia catechu*. Beyond the river, the path lies through Sal forest, gradually descending with the course of a stream, the Dhanee or Chuhul, from the eastern flank of the Bahmunee ka Danda : this, at Seetabun, is joined by the Bahmunee, a large stream, rising in the N. W. of the range so called : the united current under the name Kichree, breaks, by a romantic pass, through the great plexus of jungly hills here forming the outer range, and ultimately joins the Dubka in the outer forests. The scenery about Seetabun is extremely wild and beautiful ; Sal, of noble dimensions, occupies the plateau of level, uncultivated land between and west of the streams ; and beyond the forest, to the N. E. rises the brown ridge and summit of the magnificent Bahmunee ka Danda, not unlike Budraj, as seen from the Dehra Dhoon. Patkot, an extensive clearing, lies at its base. There is no cultivation at Seetabun, nor does any road exist for the transport of the timber ; the spot owes its name and celebrity to the legend that, at the confluence of the two streams, the persecuted dove, Seeta, found *repose* after her abduction by Rawun ; and though the site be considerably out of the line of operations between Oude and Ceylon, a grove of *Asoca* trees (*Jonesia Asoca*) flourishes in proof of the fact : introduced, no doubt, by the Gosains, and other

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These descend in the Pass to the
> level of Kotah Fort, perhaps
2500 feet.

"Ochreous Saints" who abound here, to shade and sanctify the shrines, which, however, are few, and unworthy of the extreme beauty of the spot. Its mythical fame, which seems to be connected with that of Doonagiri, attracts a considerable number of the pilgrims who visit Hurdwar, and on these the Ministers of Seeta subsist, the soil producing no other available commodity.

The outer range behind Seetabun is lofty enough for the growth of *Pinus longifolia*: and the climate of the holy spot is at this season disagreeably cold and damp by night, with a warm sun by day. Here I had the advantage of a meeting with my friend Mr. J. H. Batton, administering to the foresters the Adil-i-Nousheerwan, and to myself many valuable hints regarding the routes and natural curiosities of the Province.

The vegetation of Seetabun is that of all the higher and richer sites of the Bhabur, consisting of—

Vatica (*Shorea*) *robusta* : "Sal." "Sakhoo."

Semecarpus cuneifolia : "Bhuliou." "Bhilawa." Marking-nut Tree.

Careya arborea : "Koombh." Gun-match is made from its bark.

Antidesma diandra : "Surshotee," "Surshetee," "Umlee." The last name is from its acid fruit and leaves.

Putranjiva Roxburghii : "Jootee." "Pootrajiva."

Grewia elastica : "Phursia."

Randia longispina : "Thunela."

Strobilanthes auriculata : "Til-kupooree."

Ficus Tsiela ? Kuth-bur, (about the Temples.)

Morus laevigata : "Shah-toot." "Siyah-toot."

Mucuna atropurpurea : "Kala-goncha." "Bul-dhaka."

Tephrosia candida : "Lehtia." Its leaves are employed to poison fish.

Butea parviflora : "Moula." An immense climber which penetrates by the hot vallies a little way into the mountains; it may be seen in abundance on the Kansrow Pass near Hurdwar. Overlooked in Dr. Royle's Illustrations.

Clematis Gouriana. Most abundant.

Asparagus racemosus : "Eilora."

Curcuma angustifolia. To 6000 feet on Binsar.

Zingiber ligulatum, and *Z. capitatum*.

Zingiber elatum : "Kuchoor." A favorite food (with the others)

of the porcupine and wild hog. It is dug up in February all along the foot of the mountains, and sent for sale to the Plains, where it comes into use as a medicine.

December 16.—To Dhikkolee Pass, (the Dhekuloo of the map,) perhaps 10 miles, W. by N. About half the distance is over high table-land, covered with forest, the rest is along a series of most picturesque glens, the floor and acclivities equally clad in the same dense and beautiful forest. Close on the north rises the westermost prolongation of the Gagur, which terminates at Dhikkolee in this long, wooded, spur. It sends down a multitude of torrents, which, with those of the vallies towards Seetabun, form the Kukrar or Kukuree-nudee, carrying a brisk stream along the usual wide and strong channel, adapted to the Rains supply. It joins the Kosilla at Dhikkolee, where the latter river, though rapid, is now shallow and easily fordable. Nothing can be more exquisite in scenery than its cliff banks and shaggy hills, enlivened by flights of birds, which are comparatively wanting in the waterless forests of the plateaus; or, where present, belong to genera which only make the loneliness more marked by their melancholy notes. Amongst the former the most noisy and remarkable is a large brown-bodied and white-crested thrush Rolia or Gelooa, gregarious in flocks of 15 or 20, whose only enjoyment seems to be constant chattering : *Cinclosoma leucolophum*?

Dhikkolee is merely a Chokey in the Pass; 1308 feet above Calcutta: about a mile higher up is the usual encamping ground. On the hill to the west there are the ruins of stone houses, wells, &c.; perhaps the barracks of the Gorkhalee garrison. It was by this Pass, which ends about six miles down, that our army penetrated into Kumaoon in 1815: no opposition was encountered, and the route, which is decidedly the easiest into the province, was perhaps indicated by some of our secret friends at Almorah.

The sections cut here by the Kosilla exhibit thick and nearly horizontal beds of a very stiff, and frequently much indurated red and yellow clay, which includes the river bed, and underlies thick strata of stones, gravel, and earth, which support the forest. This red clay is said to be the substratum of the vegetable soil of Rohilkund; and the formation appears to be identical with that of Upper Assam. At Dhikkolee, on meeting the clay-beds, the water of the gravel, &c., is forced

out, and is seen to dribble down the cliffs in tiny rills. On receding ten to fifteen miles from the mountains, these beds of clay come to the surface, bringing up with them the accumulated waters of the great gravel talus above, and thus forming the swamps and morasses, which are so deadly in autumn to all but the Boksars and Tharoos, two tribes who pretend that they pine and die if removed from their native malaria.

The thickness of the gravel deposit all along the base of the mountains is enormous : half way between Tanda and Bumouree it was pierced to the depth of 150 feet, without reaching the bottom ; the consequence is that the forest tract, immediately beyond the base of the mountains, has no water but such as is supplied by Kools, or artificial cuts from the streams before they are absorbed ; at Dehra, Captain Herbert informs us that the gravel bed is 220 feet thick. We may suppose that while this tract still formed the bed of the ocean, the great rivers brought down the materials, which the currents distributed along the shores, just as the silt of the Nile, which the direction of the river would carry north, is, by the ocean-current, deposited far to the East towards Pelusium. That this process has, however, been partial, appears from two facts : 1. The gravel extends farther along the line of the rivers than elsewhere : 2. Its composition is said to exhibit a general conformity with the rock peculiar to the mountains in the rear. One point is certain : everywhere along the crest of the Sewalik range, we find the same water-worn pebbles as at its base : imbedded in sand in a position which, from their flatness, they could not have assumed naturally. The chain was, therefore, elevated after the deposition of the gravel, and on the same plan as the great ranges behind it, i. e. with its steep walls and cliffs facing S. W. and forming to the N. E. gently inclined planes, by the dip of the strata in that direction ; a phenomenon equally true of the Himalaya viewed as a whole ; the slope on the Tibetan side contrasted with the abrupt front presented to India, being a conspicuous feature in the narrative of every traveller who has passed the snowy crest : it may be compared to a sea, with the billows all breaking towards the S. W. Partial exceptions may be observed ; abreast of the Bahmunee Danda, the low, exterior range rises in steep cliffs to the N. E. at Nynee Devee on the Sutluj, the temple occupies a pivot in the second range, on one side of which the strata dip toward the Plains ; on the other, toward the snows.

The strata of sand and marl which contain the fossils of the Sewalik seem to underlie the great mass of gravel, which thus forms a sort of chronometer to assure us of the immense period which has elapsed since they lived : as the enumeration of the species—horses, camels, hippopotami, tapirs, crocodiles, tortoises, &c.,—proves the change which has occurred in the “physical Geography” of the tract where they flourished—the site of the actual Himalaya ; the nature of these animals would lead us infer much of it to have been then rather a level country than the reverse ; and that doubtless, was the period when the *Ziziphus* grew at and gave its name to Budureenath ! Under this aspect the upheavement of the Sewalik ranges was probably synchronical with that of the great granitic axis itself, and a consequence of the same forces. Although intermitted in the most of Kumaon, the Sewalik appears to be reproduced in the Chiriaghatee and Bichiakoree ranges which separate the valley of Nepal from the plains of Tirhoot. But these speculations intrude needlessly on the province of Dr. Falconer, and are only excusable by the circumstance that his work has not yet reached Kumaon.

December 17.—To Mohan, about 7 miles up the right bank of the Kosilla, on its west side, and 276 feet above Dhikkolee. A violent and bitterly cold wind blew down the Pass all the morning lulling about 10 A. M. when the air became calm, and the sun’s rays oppressive. About two miles up the river, the hills recede on each side, leaving a level valley, which, with the exception of one or two small clearings, consists of poor stony land, overrun with low jungle : on the hills the forest is unbroken. This area must have been occupied by a lake, till the Kosilla cut through the Pass ; in which an isolated pyramidal mass of clay and gravel, standing out of the river, remains the momento of the departed mountain. At Mohan, the Kosilla makes a great bend from the east, and properly turns the western extremity of the Gagur ; on the opposite or East bank is Chookum village, with a spacious flat, laid out in rice of the first quality. Its cultivation is the inducement to occupy a spot, of which the appearance of the people attests the insalubrity ; they perish in raising the staff of life. The fever becomes virulent in Asar, (June-July,) and lasts till Assouj, (September-October,) but is most fatal in August and September. The presence of the Maloo (*Bauhinia Vahlii*) is one of the tests by which, in the opinion of the

mountaineers, the unhealthiness of any particular spot is established ; it is most luxuriant in the Dhikkolee Pass, and generally up to 3500 or 4000 feet. But Chilkiya Mundee, in the open grass and *Byr* jungle, is, in spite of Pilgrim's reclamations, just as deadly as the closest forest, and is equally forsaken as soon as the rains set in. (There is, however, a long belt of forest south of Chilkiya.) The source of the malady is supposed by the people to lie wholly in the bad quality of the river water : and they state that when well water is drank, there is comparative impunity.

Just now the communication between the mountains and the Mundee is brisk and constant : large parties of the mountaineers of Gurhwal constantly passing to and fro. These people prefer fording the river frequently, in the Pass, to the ascent of 400 or 500 feet which the road makes on its left flank : for no consideration will induce a hill man to mount where he can keep to a level, or to make a circuit where he can go direct. So far as I met them, the Gurhwalees appeared a smaller and darker race than the people of Kumaon : they are abundantly national nevertheless, and sneered at the notion of Kumaon comparing with Gurhwal in richness of vegetation. The Ramgunga river they invariably term Ruhut or Ruput, a name which we meet far eastward in the Rapti, originally Revutee, from *rev* to leap, to *rare*, a very significant appellation of most of the Himalayan streams. On the higher ranges North of the Mohan valley stands or stood a fort, Kath ke Nao —the wooden boat, an odd name of which I could not discover the cause : it was held by a Gorkha garrison, which fled on the advance of Sir Jasper Nicoll in 1815. The made road is continued in this direction to Budreenath. The *Ipomoea quamoclit*, *I. pes-tigridis*, and *I. muri-cata*, the *Argyreia strigosa*, *Pharbitis Nil*, and *Coccinia indica*, are common plants in the Mohan and Dhikkolee woods : *Tabernaemontana coronaria* also grows wild here. The *Argyreia strigosa* abounds in the Bhabur and penetrates the glen of the Surjoo as high as Kupkot : the *Pharbitis Nil* (*Bounra*) flourishes up to 5500 feet at Almorah. From one of the clearings, the people brought a young Jurou for sale (*Cervus aristotelis* ?) only 10 or 12 days old they said, and quite unable to walk, it is now at twelve months old 3 ft. 8 in. high (the horns 3 inches long) and exceedingly strong. It is curious to observe the instinct of excessive caution and vigilance with which nature has endowed it, as

well as the perpetual action of its large ears, the apparatus by which these qualities are exercised : and that too where no real danger exists : but proving the numerous enemies to which it is exposed in a wild state. Unless when at speed, not a step is made without the ears being thrown forward to gather the slightest sound : and if this be any way unusual, the angry and repeated stamp with the forefeet is the signal to its companions for immediate flight.

December 18.—From Dhikkolee camp to Chilkiya Mundee, 10 or 11 miles south. In about one mile pass Dhikkolee, a clearing in the jungle, where a Buniya, a Teekadar and his guard, with one or two cultivators, are established. The road keeps the high forest land on the west side of the Kosilla, but at this season passengers prefer the shorter route along the stony bed of the river, which finally quits the outer ranges at Goolur-ghat, whence a large *kool* or cut, is sent down to Chilkiya. The made road, here very rough and stony, descends into the Plains by the Amdanda Pass, and then reaches Chilkiya after about 4 miles of flat ground, covered with bamboo, *byr*, (*Zizyphus rugosa* and *Z. jujuba*.) and tall grass jungle. It is now a populous, straggling place, larger than Huldwanee or Kaleedhoongee, and abounding in the various productions of the mountains and the Bhabur, either iron from the Khetsaree and other mines, or vegetable dyes : the Myrobolans, Kae-phul, and Pomegranate rind ? The Bhotiyas too, whom no consideration would formerly tempt to quit the mountains, now find their account in descending as far as Chilkiya, and the other marts with their Borax, Nirbysee, Doloo, or Rhubarb, Kutkee, or Pierorhiza and the leaves and stems of a small Tibetan Allium, "Jibboo," &c. for which they take back chiefly sugar and sweetmeats : sheep and goats being their only beasts of burden.

Chilkiya is 1163 feet above Calcutta, and has no water but from the artificial cut before mentioned. The mountain views of the Gagur, the Kath ke Nao, and the Lower range of Gurhwal, are exceedingly beautiful.

In the forest to-day the *Diospyrus tomentosa* was large and abundant : it is called "Tyndoo," and its timber is sold at Chilkiya as *Ubnoos* or ebony : the fruit is edible. With it grows the *Grewia sclerophylla*, "Phursia," a shrub which also produces a large and edible fruit, the "Goorbhelee" of the N. W. In the warm shaded ravines of the lower

range, *Biophytum Sensitivum* is common, as is *Didymocarpus pedicellatus*, *macrophylla* of Royle, in the Dhikkolee, as well as in the Bumouree, and Burn Deo Passes. It is well known in Kumaon as the "Put-thur-loung" or Rock clove, from the strong aroma of its dormant winter leaves, which are prescribed in cases of diarrhoea. To-day also occurred the *Gynaion vestitum*, "Peen;" probably the *Cordia incana* of Royle. It is not uncommon in dry stony ground all over the Bhabur, and ascends the mountains to 2,500 or 3000 feet, the wood is much valued for mill-work, wheels, &c. The name, denoting *fatness*, is derived from the copious viscous juice of the bark and fruit: as the *Cordia myxa* had its Hindooostanee name Lusora from "lus," viscum.

Crotalaria sericea, and *C. salicifolia*, are common plants in the Chilkiya jungles—with *Indigofera hirsuta*.

December 19.—From Chilkiya to Bundurjoora, called 5 coss, due east: about half of which may be clearings; the rest, grass, jungle, and forest. The road admits the passage of hackeries, and there is just now a considerable number on it, with many passengers from Kaliedhoongee to Chilkiya. At 1½ mile cross the Kosilla, here divided by a large island, its bed is formed of gravel and small stones. In another mile pass Br̄wa, a clearing on the Dubka, flowing now in two pretty large streams: thence through forest to Gybwa, a large clearing, north of which is an extensive plateau of elevated land and hills, covered with jungle, and isolated from the lower range; it much resembles the broken and rugged tract of Shah Munsoor near Kheree, on the Dehra road, so well known to tiger-parties. Beyond Gybwa is Patapanee, and then Bundurjoora clearing, where I encamped by the Police station. These clearings all bear marks of recent and extensive enlargement: many large trees, partially burned or lopped, stand up in the cornfields, and remind one of the "elegant improvements" of Canada and the States. To this increase of cultivation in the Turaee is partly to be attributed the quantity of once tilled, but now abandoned ground, which we perceive in the mountains.

Bundurjoora Chokey is about a mile from the base of the low range of the Kotah Dhoon. In the S. W. face of this, about 1½ mile distant there is a copious formation of vesicular calcareous tuffa or travertine, forming a cliff above 100 feet in height, and most likely constituting the mass of the range, which it does on the Kumola Pass, about 5 miles

East, where the summit, far beyond the reach of running water, is floored with it ; the Kurra, a torrent rising in the Pass, encrusts every thing with lime to the distance of three miles from the hills, and probably much farther. The rock at Bundurjoora is quarried to a great extent and carried down to the plains on hackeries, each paying a toll of six annas per load, the owner providing his own workmen and tools. The tuffa contains numerous impressions of leaves and twigs ; but the people affirm that they never come on bones of any kind.

From the crest of the cliff the view over the silent, illimitable forest, is impressive ; a vast expanse of life, the happy medium, as some one calls it, between the restlessness and misery of thought and its negation in inorganic matter. To one also, long accustomed to the panorama of mountains which surrounds Almorah, the contrast of the plains of Rohilkund, levelled (apparently) like a billiard table, is very striking, and perhaps conveys a higher idea of skill than the other does of power, in so far as the regularity of the one surpasses the wild confusion of the other : one, the result of the action of water, the other probably of fire and steam, the three agents which formed our continents in the first instance, and the last of which is now supposed to be about to regenerate them, as if the man who travels 50 miles per hour, though he be a more wealthy, must necessarily be wiser or better than he who jogs on at the rate of 5, and has time to look in and about him.

However silent these forests appear, they are by no means untenanted : even at the quarries the people are afraid to move a few hundred yards after sun set, on account of the tigers : while the Police stations are the outward and visible signs of the serious depredations which within a few years the bold outlaws of Rohilkund were wont to commit on the settlers and farmers of the wilderness.

December 20.—To Kaleedhoongee, 10 miles, of which five, to Kumola, are wholly through forest. There is a large clearing, and its usual concomitant, the Goth, at Kumola, watered by cuts from the Kurra, a stream from the Kumola Pass, about 2 miles distant ; a tolerable road goes over this to Putulia, in the Kotah Dhoon, opening a hackery route into the sal forest, which here supplies very large timber. The preservation of the Kumaon Forests, still more difficult than those of the Gurhwal, from their position, as often outside as inside the hill barrier, and therefore exposed to the havoc of innumerable smugglers.

is about to be secured by the politic enactment of exacting one rupee for every tree felled, which will save the young timber, and induce the merchants to search for the largest and oldest trees. The elephants conspire with man in damaging the woods : whole clumps of Bamboo, roots and stems, equally overturned by them, are met everywhere.

The ascent of the Kumola Ghat is gradual, and the summit level, with very gentle fall towards the Kotah Dhoon : all is completely clothed with forest. Towards the summit, we find *Bassia butyracea*, *Elœagnus conferta*, "Mijhoula;" two species of *Citrus*, probably *Limonum* and *Medica*, "Jameer," and "Bijoura," (the last also in abundance along the Surjoo under Gungolee,) ; and abundance of *Piper longum*, called "Pippula-mor," an article of considerable value as an export. There is also a species of *Embelia* with fruit in umbels ; and a handsome shrub, *Tetranthra fruticosa*, or *apetala*, which also grows at Poonagiri, below Gungolee, &c., and is sometimes known as the "Gur-bijour," or wild citron, and *Myda* or "Meda-lukree;" but the tree particularly so designated, pointed out to me near Ramesur, appeared to be *Laurus villosa*, Roxb. and its Hill name *Kupooa Kouwul*. At the mouth of the Pass, *Rubus distans* and *Calamus Rotang*,* "Bet," are found.

The construction and nature of the Goth demand a few words. The term is corrupted from "goshth," a station for herdsmen or cattle, and in the mountains denotes the ground-floor of the house, devoted to cattle, as distinguished from *panda*, the upper storey, occupied by the family. In the Bhabur, where the arrangements are temporary, and only calculated for the winter, ranges of from ten to twenty rude sheds are placed side by side, formed of branches, and roughly thatched with grass and leaves. The depth is sometimes 150 or 200 feet, and any rain-water which might pour down through the re-entering angles of the general roof, is carried away by small gutters. The exterior walls are generally well fortified with brambles to repel the approach of wild beasts. The height is little more than enough to admit the cattle to stand ; their owners occupy the inner end, which is partitioned off, and made snug with plaster, &c., for their abode. Here they luxuriate in boundless ghee, milk, and curds, selling the former in great quantities to dealers from the plains. It would seem to be a very prolific food ; children of all sizes lie about as thick as the quails round the camp of

* *Calamus Roylei*, Griff.?

the Hebrews ; and many of them probably depart as suddenly ; at least the adult population of the mountains is by no means in proportion to the supply in these nurseries. Filth, exposure, and want of all medical aid, must destroy one half of them ; but, like the shrimps noticed by Paley, leaping on the sea sands, their brief existence is a merry one.

But the tenants of the Goth by no means trust solely to their cattle ; the neighbouring fields exhibit the finest crops of wheat, barley, and mustard, the produce of the latter alone sufficing, it is said, to pay the Government revenue. It is called "Dyn" or "Daeen," and "Lace :" *Sinapis glauca*, var. ? it is now in full bloom, reminding one of the western "Praiseagh buidhe ;" and will be ripe in February and March.*

These clearances are altogether dependent on artifical irrigation, and are only to be found where streams debouche from the mountains, or a few miles to either flank : in the intermediate localities, much of the ground is too poor and stony to repay the expense of cultivation, while already, the supply of water scarce equals the wants of the settlers, and

* Several species of *Sinapis* are cultivated in Kumaoon for the oil, salad, or medicine they yield. But as Dr. Royle, very truly says, the genus requires careful revision : Roxburgh's descriptions, generally so accurate, are here imperfect, contradictory, or identical : and recal the reasons of Hudibras—

" His reasons fitted things sa well,
That which was which he could not tell ;
But oftentimes mistook the one,
For the other, as great clerks have done,"

according to the best of my judgment.

"Rara" is *Sinapis glauca*, the "yellow Surson" of the plains, sent from the Seharunpoor garden as "Bunga-surson ;" i. e. Bengal-surson. The natives of northern India always understand this when they speak of Surson : the branches being solitary, it is not *S. juncea*.

"Dyn :" "Daeen :" "Lace." The commonest sp. in Kumaoon ; seems to be the "Toria" of northern India, which Dr. Royle identifies with *S. glauca*.

"Though not so tall and stout a plant as the Rara, it has much the same habit, and is equally glaucous. Its round petals, spreading siliques, and reddish brown seeds, induce me to think it may be Roxburgh's *Sinapis dichotoma* : otherwise he does not allude to this plant : but the stem is not dichotomous. It is either a variety of *S. glauca*, or a nearly allied species.

"Luhota," "Lyhta," cultivated in the Bhabur under this name, seems to be the "Jurria" of Almorah, and probably the Kalee Surson of Seharunpoor, &c. : *Sinapis dichotoma*, according to Dr. Royle. The seeds are nearly black ; Roxburgh's are described light brown.

"Doowa." *Eruca sativa* : cultivated in the Bhabur, and variously known as "Tara," "Sebooa," "Gohooa," from Oude northward. The stem is covered with reflexed hairs.

"Teera." *Raphanus raphanistrum* ? said to be cultivated about Benares.

is a subject of frequent dispute. If therefore, the whole Turaee be ever reclaimed, it will be by a judicious system of canals from the large rivers, supposing the levels to admit, and the water to be not demanded for the richer countries below.

The total area of cultivated acres in the Kumaon Bhabur, Mr. Batten informs me, is 18,500

Which are assessed at rupees, 9000

Revenue from timber, bamboos, grazing, 18,700

From which it appears that the district is one of more interest to the naturalist than to the Government.

Each bullock brought to graze is charged by the farmers of the revenue, three annas per season : each buffalo, four. A cart for drawing timber pays twelve annas to one rupee per trip ; judging by the competition in this trade, it must be lucrative.

At Kumola the direction of the route to Kaleedhoongee changes from E. S. E. to East ; adjoining the cultivation of the latter is the extensive clearing, Nyagaon ; both watered by the Bor or Boula river, the bed of which, now an expanse of boulders and gravel, is crossed near Kaleedhoongee. Beautiful views of the Nynee Tal group of mountains, rising tier above tier ; the Symdhar, a pine-covered range of 6800 feet, breaking off from Deoputa near Koorpaka, is here perceived to interpose between Cheenur and the lower mountains to the S. W. These last are completely enveloped in forest, much of which is Sal.

*December 23.—*From Kaleedhoongee to Huldwanee Mundee, 15 or 16 miles, by a good hackery track. To Chousula, 5 miles, the soil is little else than gravel, supporting a thin and stunted forest, traversed by half a dozen dry channels of the Nihal, the westernmost of which passes a few hundred yards east of Kaleedhoongee. Chousula is a cleared tract close to the mountains, watered by the Bukra, a torrent from the Bilooa Khan mountain, the summit of which is visible, in the direction of Nynee Tal. Embelia robusta and Clerodendron siphonanthus grow in the Chousula woods : though abundance of the first is to be had hereabouts ; the Almorah druggists sell the fruit of Rottlera tinctoria for it, as the true Bhaberung !

Leaving Chousula, the road, still skirting the mountains, passes the spacious clearings of Futtelpoor, with a very neat Police Chokey ; Peepul-pokhra, in the heart of a thick sal forest ; and Loogria sal, a

very large and apparently recent settlement, watered by Kools (parbutice *gools*) from the Gôla river above Huldwanee, which is three miles on : the intervening land is almost all under cultivation, and Huldwanee itself is a very open, and compared with other marts of the Bhabur, a healthy locality. For several years it was the chief entrepot for Kumaon, but Kaleedhoongee will prove a formidable rival. It was founded by Mr. Traill in 1834, and has its name from the Hulloo trees (*Nauclea cordifolia*;) it consists of a quadrangular enclosure, perhaps 80 by 40 yards, the shops facing inwards, but forming a complete antithesis to the Royal Exchange ; there is, however, a brisk traffic in cloth, blankets, salt, sugar, grain, groceries, &c. in exchange for the products of the mountains, the natives of which so manage as to arrive here on Tuesdays, when the market (penth) is held. Close on the east is the broad, stony bed of the Gola, Goula, or Gargee, the Kitcha of the Plains, a rapid and considerable river, draining the four mountain lakes, Nynee, Bheem, Noukoochia, and Mulooa Tals. To the N. E. in the second range of mountains, Loolan Putee, Dhyanee rao Pergunna, there is a sacred and very conspicuous cone, called Kylas and Muhadev ka Ling, the form of which is said to come very close to the original ling in Tibet : a fair is held on it in Phalgoon, just before the Holee. The East is not farther from the West, than the state of public feeling which glories in such a phrase as the above, is from our own. The French have an anecdote that in a diplomatic conference between Lord Castle-reagh and Talleyrand, the former, with a terrible solecism in French grammar, remarked, ‘Perhaps my life may be longer than your Excellency’s ;’ to which the bishop drily replied—“Pent-être.” It was nevertheless, by this standard that the superiority of Siva over Vishnoo was measured, for while the Vaishnavas boast the four great shrines of their lord, Ramisseram, Budureenath, Dwaraka, and Jugunnath, embracing the length and breadth of the land, they cannot deny that Vishnoo upwards, and Brahma downwards, in vain endeavoured to reach the limits of Mahadeo ka ling !

In the neighbourhood of the Kylas Cone there is a remarkable scar on the declivity of the Birond Mountain, reported to be 8000 feet high, and lying nearly due south of Almorah. Birond was one of the Great Trigonometrical Stations : but the Map of this district is hitherto unpublished.

Huldwanee, not Bumouree, is the best and usual encampment for troops : Bumouree is in fact altogether off the road to the N. W., and Kath Godam, 3 miles north, at the very foot of the mountains, though provided with a Buniya and a Bungalow, is extremely disagreeable from the boisterous winds that blow down the Pass.

Roodurpoor, about 20 miles S. of Huldwanee, rather a large and pretty place, is most unhealthy, from the prevalence of deep swamps and stagnant nullahs ; the forest reaches to within six miles of it ; the grass and swamps extend S. as far as Manpoor, nearly 30 miles from the mountains, being an excess of seven miles over the depth of the malarious belt on the Moradabad and Nynee Tal line, and an additional argument in favor of the last. About November the herds of cattle begin to assemble, and, as the grass is burnt, disperse over the Turaee, feeding on the sweet and nutritious shoots which in 10 to 15 days, spring from the ashes. Till this general conflagration, such is the height and thickness of the various Arundines, Sacchara, and other rank grasses, many of them sufficiently tall to conceal an elephant and its rider, that this region is impenetrable. In autumn their innumerable waving white plumes convert the prairies into boundless "seas of milk," if indeed the Indian expression was not rather derived, as an ingenious friend suggests, from the seas of white clouds feeling up all the vallies, and seen from some "heaven kissing hill" of the Himalaya. My visit to the Bhabur was at an unfavourable season for identifying the Gramineæ, but the following seemed the most conspicuous.

Saccharum spontaneum : "Kas," "Jusha," "Jhansh."

Saccharum semidecumbens : "Tat." "Neja," its grass, "Mora." The culms are used for screens, and supply Kumaon with pens. It is the "Kilik" of the Plains, Oude, &c. from "Kil," to be white.

Saccharum Munja : "Moonj." The blade beaten and twisted, makes a strong rope : the culm is "Sirkee."

Saccharum sara and *exaltatum* : "Surhur," "Suroor."

Arundo karka : "Nul :" "Nul-toora :" to 5000 feet.

Arundo ? — "Khyla :" "Khylooa :" said to intoxicate and even poison cattle fed on it : to 3500 feet in the mountains.

Anthistiria arundinacea : "Ooloo," "Kunyoor," "Kundoora :" to 3000 feet.

Andropogon muricatus : "Gandur"—the roots "Khus"—the culm "Seenk."

Andropogon (Sorghum) halepensis : "Buroo," "Burai : "Rikhonda;" to 3000 feet.

Imperata cylindrica : "Shiro."

Andropogon Iwaruncusa, (i. e. *elephant* or *best* Koos, from *ibh* :) "Myria," "Gangulee," "Cheretta." "Dab," "Peeria." The last is properly the *Cymbopogon* so abundant in the mountains, with roots smelling and tasting of lemon and ginger. *A. Iwaruncusa* grows along the Surjoo nearly (perhaps fully) as far as Bagesur, and as high as 3500 feet.

Typha elephantina : "Pudera," "Petara." This penetrates the mountains a long way by the course of the Kalee : the leaves are much used in the manufacture of soft mats.

About Huldwanee, *Martynia diandra* is completely naturalized : the following trees, &c. are common.

Ulmus integrifolia : "Kunjoo :" the trunk is generally covered with an orchid, probably *Vanda cristata*, or *Cymbidium tesselatum*. *Cymbidium triste*, *Oberonia Iridifolia*, *Pholidota articulata*, &c. abound here, and on the outer mountains.

Leonotis nepetæfolia : "Gooma."

Pogostemon plectranthoides : "Roodra," "Roodla," up to Almorah.

Lantana dubia : up to 2500 or 3000 feet.

Sponia ——— "Khusuroa." Its glossy, but extremely scabrous leaves, are used to polish wood : probably the "Khaksi" of Kirkpatrick's Nepal.

Solanum verbascifolium : "Usheta :" the pounded leaves are used to expel leeches from the nostrils of cattle ; the Reetha or soap-nut is similarly employed.

Solanum diffusum.

Solanum Jacquini : "Kunth-karee."

Solanum rubrum : "Chhota-gheewaen." The berries of this night-shade are eaten with impunity by the mountaineers.

Bauhinia purpurea? *B. parviflora*, and *B. Vahlii* (*racemosa*.)

Cassia Tora, *C. purpurea*, *C. absus* : "Bunar."

Butea frondosa : "Dhak."

Desmodium gyrans.

Dicerma pulchellum.

Tephrosia purpurea.

Caesalpinia bonducella : "Kuronj." The fever-nut : probably introduced.

Clerodendron infortunatum : "Blutt."

Clerodendron ternifolia.

Casearia Cheela : "Cheela," "Cheelara."

Phyllanthus leucopyrus : "Ainta."

Spondias mangifera : "Umbara."

Wendlandia cinerea.

Gmelina arborea : "Goomhar."

Ficus Cunia : "Kewnia." To Roodurpoor.

Ficus oppositifolia : "Totmeela."

Leea aspera.

Artemisia indica : "Patee" : *A. elegans* (Roxb.) "Jhou."

The upper forests to the base of the mountains, are choked with endless briars : *Caesalpinia sepiaria*, "Eira," the Mysore Thorn : *Acacia caesia*, "Kutrar." *Acacia pennata* (*Buchananiana* ?), *Mimosa rubricaulis* : both called, "Agla :" the pitiless *Acacia catechu* : all, except the last reaching to about 4000 feet elevation in the mountains, where *Rosa Brunonii* is equally bad.

Plants common to the whole Bhabur, are—

Acacia elata : "Buro."

Acacia speciosa (*Lebekh* ?) "Tantia." "Kulsees."

Acacia Catechu : "Khyr."

Robinia macrophylla : "Gonjha," passim.

Dalbergia Sisu : "Seesoo," "Seesum."

Flemingia semialata : "Bhutia."

Mucuna pruriens : "Goncha."

Cassia fistula : "Kitola," "Itola." "Raj-brichh." This "king of the trees" flourishes to nearly 4000 feet elevation, and is, as Dr. Royle observes, even more brilliant than the Laburnum—the "Golden Rain" of the Germans. He has, however, fallen into a trifling oversight in stating (Illustrations : 184,) that it flowers in March : May and June are the months. The fruit is collected in large quantities and sold at the various mundees ; the "Umultas" of the Plains.

Abrus precatorius : "Ruktee," "Rutnulia."

Bombax malabaricum : "Semul." Flourishes to at least 4500 feet in

the mountains : the seed is eaten by the Buceros, called here " Hoong-zee-bagh."

Heliocetes Isora : " Jonka-phul," " Muror-phul."

Abutilon Indicum.

Moringa pterygosperma : " Synjuna." " Horse-radish Tree."

Sesamum orientale : " Til," very abundant in the more open woods, and evidently wild.

Premna mucronata : " Ugnioon :" from the Sanscrit " ugnimuntha," "churning fire;" from the custom of procuring fire by friction of two pieces of its wood, about Almorah. " Ugnioon" is applied to *Euonymus Hamiltonianus*.

Premna spinosa. Dr. Wilson gives " Urni" as one of the Sanscrit synomyms of this tree : but all over our Northern Provinces it is the well known name of *Clerodendron phlomoides*, corrupted in Goojjurat where it is abundant into " Irun" and " Arnee." A more careful examination of the popular names of plants would considerably diminish the now improbable number of Sanscrit terms applied to the same object. *Premna* and *Clerodendron* being of the same order are likely to have in common the property of ignition by friction.

Vitex negundo : " Mewree :" " Shiwalee." Further enquiry throws doubt over the probability of Shiwalee being the *Sephalica* (*Nyctanthes*), though in Bengal, the latter is called " Shioolee :" on the contrary, the Kumaoon term, (" Sinwar" in Behar) appears to come from the S. " Sindhoovar" "choosing the water," a very apt designation for *Vitex*. The Chinese in Kumaoon make a kind of tea from its leaves. *Vitex trifolia*, and *V. incisa* probably exist, but I have not discriminated them hitherto.

Emblica officinalis : " Aonla," " Amla ;" up to about 4000 feet. Wilson gives the etymology, " clean, pure :" but since " uml," " aml," denote sour, acid, and this is pre-eminently so, these would seem to be the roots, as avowedly of " umlika," " amlika," the Tamarind. " Emblica," indeed appears to be the same as " Amlika."

Rottlera tinctoria : " Rooen." " Rolee."

Terminalia chebula : " Hur." " Hurura."

Terminalia Bellerica : " Byhura."

Pentaptera glabra : " Saj."

Lagerstroemia parviflora : " Dhoura," passim.

- Grislea tomentosa* : "Dhoulā." To Almorah ; and 6000 feet.
Ehretia laevis : "Kodah," which, at Almorah, is *Cordia myxa*.
Tetranthera monopetala : "Kutmur." "Kukooree," "Kerowlee," "Putoya." Probably the Sanscrit *Kutumbura*.
Cordia latifolia : "Borla," "Byrala," "Bourala."
Randia dumetorum : "Munyool," "Mynphal."
Kydia calycina : "Puta."
Stereulia villosa : "Oodial."
Garuga pinnata : "Kitmira." The leaves are excellent fodder for cattle : hence "Khuiput," "Grass-leaf," the name in Gurhwal.
Wrightea mollissima : "Doodhee."
Holarrhena pubescens, (or *antidysenterica*) : "Kooer," "Koora," "Kooda," *passim*.
Cucumis Hardwickii : "Air-aloo." In Kumaon, the term "In-drain" is appropriated to *Trichosanthes palmata*.
Lygodium semi-bipinnatum, and *L. japonicum* : two scandent ferns.
Azadirachta indica : "Neem," nowhere indigenous, but planted near the Goths and Mundees, the leaves being greatly valued by the mountaineers. The force of "azad-i-durukht" is "spreading tree :" more true of the *Bukayun* than of the Neem.
Cannabis sativa : "Goon-bhangā,"—the fertile plant, yields seed for oil, and *Gunja* : "Phool-bhangā" the male plant, fibre only : from this are made strong ropes, and the sackcloth, called "Bhungela :" "Koth-la," "Bora" and "Gajee." The wild hemp, "Jungulee-bhangā" is of no use for fibre, and merely affords "Churrus." The word "Sun" seems never used to denote *Cannabis sativa*.
- December 24th*.—From Huldwanee to Bheemtal, about 14 miles. At three miles is the bungalow called Kath-godam, at the base of the mountains, and mouth of the Bumouree Pass, 1896 feet above Calcutta. It derives its name from the wooden Store-room erected here in days of yore for the commissariat : from which circumstance the "godam" has now in Kumaon become universal to express supplies of provisions. The place is now one of small resort, the violent blasts of wind which rush down the Pass during the night and morning being excessively cutting and disagreeable at this season ; about 1½ miles on the sandstone rock first occurs in situ at the short ascent called *Hath-gya* or *guleeon*, below which the Hill-porters formerly refused to carry their loads.

This sandstone, which forms the mountains up to Bheemtal, is exactly the same that we meet with between Bar and Subathoo : it is here beautifully stratified : the strata dip N. E. or from the Plains. A short but rather abrupt descent (the main difficulty in the carriage road to Nynee Tal,) leads from Hath-guleeon into the hot and narrow, but pretty valley of Chouhan ka puta or pata, watered by the Goula, with a hamlet called Hath, and a Goth on the acclivities. A little higher up is the Mango-grove, "Ranee kee Bagh," where the Goula receives the Buliya from Nynee Tal to the N. W. A little below the point of junction, at a holy spot called Maeepoor, or Maiapoor, where a fair is held annually in January, is the Chitr-sila—"the mottled stone," a huge rounded boulder of quartz conglomerate, reposing on a deep cleft in the sandstone, which forms the right bank of the Goula. It is sacred to Devee and Mahadev, and is greatly venerated—no new thing under the sun, as may be seen in the book of Isaiah, c. lvii. The people of Kumaon always burn their dead at such a "sungum" or confluence. A house, entirely of gold, is believed to exist somewhere here, but invisible from enchantment. The Buliya is here crossed by an iron suspension bridge, a short ascent from which brings us to the stony and uncultivated dell called Umritpoor, on the Burokhuree or Bheemtal stream, which also joins the Goula close by. From Umritpoor is the way to Kylas mountain. From Kath-godam to this point the Pass is sometimes much infested by tigers, and so many are its intricacies, and such the luxuriance of the forest which overhangs the road, that their destruction is rare and accidental. About 25 persons were devoured or killed here this season ; but so capricious are these brutes in their haunts, that not one casualty seems to have occurred in 1847. The Nynee Tal cluster of mountains is rather lumpy as seen up the Buliya, but the glen itself is most beautiful, the path to Nynee Tal keeping to its south side, deliciously shaded by the forest and the mountains.

There are several small Goths, where Turmeric, &c. is cultivated : Kushainee, Jeeolee, Dogaree, &c. standing for the most part on elevated gravel plateaux.

From the upper end of the Umritpoor dell the ascent is nearly continuous to Bheemtal, passing the Pukurbhura stream, and the Suriam and Tooshiara Panees, with springs and wells. In a profound glen to the right, the Burokhuree rattles along its shingly channel, passing

under a small village so called, which tradition has handed down as destined to be overwhelmed one day by the bursting of Bheemtal.

The scenery here is wild and beautiful : indeed the Bumouree Pass is glorious in the superb and varied outline of the mountains, and in the exuberant forest which every where clothes them ; frequently bound together into impenetrable thickets by the Acacias, Bauhinias, Robinias, Vines, Ivys, and other *lianæ* which coil their boa-like stems round the trees. This richness of vegetation contrasts remarkably with the thinness and even bareness which prevail more or less on the same south aspect from 4500 or 5000 to 7000 feet. Nothing can exceed the force of the wind or the heat of the sun in the Bumouree Pass, and yet its forests are without a break. A phenomenon perhaps to be attributed to the dampness of the climate, which, at all seasons suffices to nourish very numerous orchideous epiphytes, and in the rainy season, when this range is drenched with perpetual showers, a profusion of Balsamina, Didymocarpus, Platystemna, Chirita, and other plants, half vapour, half zephyr, which become rare, or disappear beyond the Gagur. Thus in the Belkhet valley also, lying south of the Kanadeo range, answering to the Gagur, we find the north and south side of the exterior range a mass of luxuriant vegetation, while the north aspect, forming the southern flank of the second range, is comparatively denuded, till we approach the summit. Probably twice the quantity of water falls on the outer ranges, which must find its exit in more copious springs along the base of the mountains where the forests are thickest. It may be, also, that the zone of 5000 to 7000 feet, on the south face of the Gagur, and its continuation, is a sort of debateable land, too cold in winter for the products of the Turaee, and too warm in summer for those of the mountains, which last are found to flourish at the same or much lower level on the opposite and shaded side : where also, from the diminished evaporation, "the scent of water" is more abundant.

Either from the presence of this universal forest, and its associated fever, or that the mountaineers are attracted by the richer and more easily irrigated lands of the Bhabur, the S. W. border of Kumaon is very thinly inhabited and scarcely cultivated at all ; while the corresponding belt from Sirmour to the Ravee is densely peopled, and every where scarped into terrace-fields of corn, ginger, turmeric, &c. ; the last two being five or six times cheaper than in Kumaon.

Approaching Bheemtal, we first meet the Bassia butyracea, " Chioora," or Butter-tree, at Tooshiara Panee, at about 3500 feet elevation ; it grows considerably lower down in the dell of the Buliya : its flowering time is Nov.-Dec. The vegetation above Tooshiara Panee begins to change rapidly, and at length a slight descent from an easy Pass, opens the Bheemtal, a pretty blue Lake, 3000 feet long by 2400 broad (Herbert) and 4445 feet above Calcutta. The road follows its eastern brink, and near the northern end, crosses the clear, rapid burn which carries off the superabundant waters into the Burokhuree and Goula. At this point stands an old temple of Mahadev, shaded by a very fine Toon tree and a little beyond is the bungalow. This, the N. E. side of the lake, is bounded by a range of low trap hills, on one of which, south of the bungalow, the Gorkhalees had a small stone fort, Chhukhata Gurhee, now dismantled. The name, which is that of the pergunna, is said to refer to its six Lakes. To the N. E. and N. W. the mountains rise 1000—1500 feet by easy slopes, and though deficient in the crags and forests of Nynee Tal, present scenery of a very pleasing, open descrip-
tion. To the north, Bheemtal communicates by a tract of flat, marshy, and partially cultivated land, with the Kooa or Surria Tal, which at present is merely a large pond : an exceedingly tortuous, but perfectly clear stream flows down from the Kooa Tal, and only wants a few willows to resemble the fens of Lincolnshire. A small bund at the temple would inundate all this tract to the envy of Nynee Tal : while on the contrary, a corresponding cutting of the actual barrier would fit it for excellent cultivation, after the heart of such utilitarians as Baillie Nicol Jarvie, who would have drained Loch Lomond itself. The measure might indeed be here expedient to gain land for the Tea Plantations ; several of these, the Kooasar, the Bhurutpoor, the Russian, already cover the fields and slopes hereabouts, as well as two miles eastward on the Noukoochia Tal : and however their flourishing condition, and sanguine prospects be admired, it is impossible to shut one's eyes and ears to the fact that the owners, or at least, the holders of the land, are most reluctant to surrender the inheritance of their fathers, though the Government compensation be on a liberal scale. There was even "a sough" that they intended to stone the superintendent and uproot the shrubs : but these were, at the worst angry words : and when the farms are made over to them, and a handsome price paid them

for the green leaves, they will probably change their minds on this matter.

Three to four miles west from Bheemtal across the ridge above the Kooa Tal, in a deep basin, lies the group of lakelets called "Sat Tal," generally of a circular form, and much resembling volcanic craters. The neighbouring hills are of trap, capped by slate. These lakelets discharge their waters into the Buliya ; and are fed from a system of glens separated from that of Bheemtal by a low neck near Mahra village, north of the latter.

In the Bumouree Pass and upward, occur,

Argyreia strigosa (or *setosa*) : to 3500 feet.

Coffea Bengalensis : "Kuth-jah^{ee}."

Holmskioldia sanguinea : "Koobtolia :" to Bheemtal. It is remarkable that the natives have no well-fixed name for this beautiful shrub, which is sometimes mistaken for the Fuchsia.

Bœhmeria frutescens (or *tenacissima*) : "Poce." Nets are made from the fibre, which is very tough.

Bœhmeria macrophylla (or *macrostachya*) : "Gurgela."

Bœhmeria nervosa : "Getee." The wood is turned into bowls, &c.

Bœhmeria salicifolia : "Tooshiarce."

Ruellia latibracteata.

Strobilanthes.

Panax fragrans : from 2000 feet up to Bheemtal.

Hedera parasitica : "Kot-semul :" from 2000 to 3500 feet.

Vitis latifolia : "Pun-luglee :" "Bhynsia-umlce."

Vitis lanata.

Cissus serrulata : occasionally an immense climber : from 2000 to 4000 feet.

Croton polyandrum.

Grewia didyma : "Bhimool."

Abutilon oxyphyllum (Edgeworth) : near A. *polyandrum*, common here and the Kotah Pass at 3000 feet.

Cocculus cordifolius (or *verrucosus*) : "Goorcha."

Pothos officinalis ? "Huthunglia, "Guj-peepul." The leaves of the Kumaoon plant are often deeply cut : hence the name : "hand and fingers."

Curculigo recurvata : "Petaree."

Kalanchoe varians : "Noonoo." "Bukul-puta."

And, generally, what have been already noted in the descent from Nynee Tal; but in the shady dell of the Buliya, between Jeeolee and Kushainee, we have *Wallichia* (Harina,) *oblongifolia*, Griffith; Ground Palm, "Kala-ounsa."

Sabia campanulata.

And a little lower, between Jeeolee and Dogaree, *Thunbergia coccinea* covers every tree and bush with its dark stems and leaves: it is in full bloom all the winter, with innumerable drooping racemes of intensely red blossoms.

Neither this nor the *Wallichia* Palms, are to be met from the Bulya to Dhikolee: the former is, therefore, in all probability,* their N. W. limit. Towards the Snowy Range Lieut. R. Strachey found the *Wallichia* on the Ramgunga, within 25 miles of the glaciers.

* At a time when the geographical distribution of Plants is a subject of interest, the following particulars of the Flora of Rajpootana may not be out of place here.

Cadaba indica : "Jethi-mudh." Palee in Marwar.

Niebuhria oblongifolia : "Chekul." Nusseerabad.

Cassia auriculata : "Awul." Nusseerabad. The bark much used in tanning.

Poinciana elata : "Sundura." Common by towns and villages in Marwar.

Crotalaria ramosissima : "Suntra." Jeypoor.

Acacia ——— ? "The Cypress Bubool." Nusseerabad and on towards Dchlee. Amongst the Mairwara Hills about Beaur, S. W. of Ajmere, occur:—

Balsamodendron agallocha ? "Googgul." The *Amyris commiphora* of Roxb.

Vogelia indica : "Chitrawul." "Chitra."

Toddalia aculeata: "Duhun." "Luhun."

Sarcostemma viminale: "Dukhunee-tohur."

Balanites Ægyptiaca : "Heengo," "Hingota." Stiff clay land from Goojrat to Kurnal.

On the sands of Jeypoor and Shekhawutee :

Lithospermum vestitum : "Rutunjot."

Leptadenia spartium (or *Jacquemontiana*). "Kheep."

Ephedra ——— : "Phok."

Orobanche Calotropidis, (Edgeworth.)

Prosopis spicigera : "Jhund"—covers extensive tracts in Shekhawutee.

Artemisia elegans ? "Bunna." Ditto.

Peganum Harmala : "Isbund."

Berthelotia lanceolata : "Lesan," "Resun." } Ferozpoor.

Kentrophylum oxycaanthum : "Poree."

Asphodelus clavatus : "Piazee." Whole fields with nothing else, between Umbala and Ferozpoor.

At Bheemtal we enter on a new vegetable zone :—

Quercus incana : about a thousand feet lower than its limit in the Simlah mountains.

Castanea tribuloides : “Kutonj,” near the Hurria Binaik, above the lake.

Flacourtie sepiaria : “Kundye.”

Celastrus nutans : “Malkaknee.”

Celastrus spinosa : “Gwala-darim.”

Cocculus Roxburghianus : “Goorjial,” “Gurjial :” the “Peer-gruij” of Silhet. Enormous tubers.

Cissampelos convolvulacea : “Parec.”

Phyllanthus leucopyrus : “Ainta.”

Phyllanthus retusa : “Dhunee.”

Euphorbia pentagona : “Seehoond.” A favorite habitat of the beautiful *saccolabium guttatum*, which the Chinese say grows also in their country.

Cissus capreolata : “Punch-puta.”

Clematis Buchananiana and *velutina* : “Ghuntiali.”

Ranunculus laetus.

Ranunculus sceleratus : “Sheem.” “Jygunee-ainwa,” equally at home from Chouringhee to Arthur’s Seat.

Berberis asiatica : “Kilmora.” (*B. aristata* commences at 5000 feet, near Shamkhet.)

Prinsepia utilis : “Jhutela.”

Rosa Brunonii : “Kooja.” “Kweea,” “Kweeala.”

Rubus rotundifolia : “Heesaloo.”

Pyrus variolosa : “Mehul.”

Crataegus crenulata : “Geengaroo.” From 2500 to 7000 feet, but most luxuriant between 5000 and 6000.

Cerasus pudum (Royle.) *Prunus cerasoides* (Don’s *Prodromus*.) “Puya,” “Pudm.” A sacred (pavitra, pure) tree amongst the Hindoos ; the name is from the S. “Pudmaksh,” “Eye of the Lotus,” in allusion to its pink blossoms, which appear in Oct.-Nov., and are soon succeeded by the leaves, which are of a glossy green, and in January, beset by myriads of aphides, which distil great quantities of honey-dew over them. This tree attains its perfection at Almorah, where it is the only evergreen, a very ornamental object amidst the prevailing sternness of

the scenery. The fruit ripens in spring : but it was completely destroyed by the snow of January and February 1847.

Viola Cæspitosa.

Impatiens balsamina : "Mujethee." A red dye is made from its leaves and flowers.

Jasminum dispermum : "Soormalee."

Medicago lupulina

Lathyrus. { *angulatus.*
 { *aphaca.*

Common in the fields.

Androsace incisa.

Ervum hirsutum.

Ilex excelsa.

Tetranthera : "Kouwul." Several species.

Streptocalon calophyllum : "Dal-bhengoola."

Chirita bifolia.

Aechmanthera tomentosa or *gossypina* : "Joundela." "Jhoola-boota." In profusion on all the hills around : especially towards Mu-loo Tal. In the low vallies between Cheennur and the Kotah Dhoon, it rises 10 to 12 feet high, a strong bush.

Porana racemosa.

Tragopogon elegans : "Gwalla." "Golshia." A pot-herb.

Bryonia laciniosa : var.

Zingiber chrysanthum ? a sp. with habit of *Z. ligulatum*.

Salix tetrasperma : "Bhynsh." *Syzygium jambolana*, "Jamun," *Ilex excelsa*, &c. fringe the lake with Banj oak : the Lotus, *Nelumbium speciosum*, "Kouwul," or "Kunwul," grows in the lake, but still more abundantly in Noukoochia Tal : this, 4500 feet, being the highest level at which it seems to flourish. In the Lake are also to be found—

Potamogeton mucronatum, *crispum*, and ——.

Hydrilla verticillata.

Phragmites nepalensis : "Nul." "Tot-nul."

Scirpus lacustris ? a great Bullrush.

Sagittaria sagittifolia.

Myriophyllum indicum,

and on the swampy brink towards the north end,

Altiranthera nodiflora : "Bheemraj."

Veronica anagallis.

Ammania rotundifolia.

Plantago lanceolata.

Procris ——— “ *Souchula*, ” used as a pot-herb.

Nasturtium officinale.

Drymaria cordata.

Acorus calamus : “ *Buj*. ” “ *Goor-buch*. ”

Coix gigantea.

Egnisetum.

Adenostemma latifolia.

Epilobium (cylindricum ? Don.)

Mentha Royleana.

Hydrocotyle tenella.

Polygonum horridum : here only : abundant.

December 25.—From Bheemtal to Mulooa Tal, 8 or 9 miles East.

Path rugged, gradually ascending an arid quartz mountain, of which the last ascent, at 3 miles, is composed of an exceedingly hard syenitic greenstone, of which Captain Herbert detected scattered fragments only near Bheemtal. He appears to have passed this district almost unaware of the predominance of this class of rocks. The brow of this mountain, known as the Ekwye Binaik, is from 5500 to 6000 feet above the sea ; it slopes south in a richly cultivated talus, to the Noukoochia Tal, a pretty tarn, embosomed in low rounded hills ; the outline broken into deep bays, originates the name, which signifies “ Nine-angled.” Its level (4368 feet) is somewhat below that of Bheemtal. Each lake sends forth its stream, which, meeting in the centre of the dale, form the Burokhuree. About the junction, there is an extensive formation of green and slate-coloured clay, called Komet, used in washing walls, &c. arguing perhaps the former extension and even union of the two lakes.

Fully 2000 feet below the Ekwye Pass to the East, flows the Goula, in its narrow and beautiful ravine : beyond this rises a lofty oak-covered spur of the Gagur, in the highest and remotest recesses of which are the sources of this river. The people call the spot the Champee ka gar, denoting probably the Satchoolia Group, East of the Gagur Pass : this latter also furnishes its tributary.

Descended S. E. over quartz rock, and amongst pine, oak, rhododendron, and a coppice of *Aechmanthera*, to the Goula, at Sukinjala

Goth, about a mile above the spot where it expands into the Mulooa Tal: it is a pretty large and perfectly clear stream, but is pushing a great bank of stones and gravel into the lake, which must ultimately be filled up, if not previously emptied by the bursting of the barrier at its lower extremity, which is said to be wearing down rapidly. The dimensions of the lake are about three-fourths of a mile from N. W. to S. E. by 200 to 300 yards across; the water clear, very deep and of a beautiful green, *Como* tint, derived perhaps from the reflected woods. Unlike the other Kumaoon lakes, it is well stocked with large fish; a circumstance due to its inferior elevation, being only 3751 feet above Calcutta: this is accompanied by a sub-tropical vegetation, and the small villages in the neighbourhood, Kunialee at the upper, Shewa Kanulla at the lower end, are forsaken in the wet season, from the presence of *oul* or Turaee fever. The lateral mountains fall so abruptly to the water, that much difficulty is experienced in getting round the lake. High above the exit of the Goula, on the N. E. mountain, is the immense scar, called the Mulooa ka Pyhra—"the landslip or rather rockslip of Mulooa," the fall of which, according to the tradition of the country, formed the lake by damming up the narrow glen: and certainly must have deepened it. The people preserve the usual legend, and even the name (Bhoor Koonda) of the village which was overwhelmed by the landslip; Mulooa, the owner of this village, shared its fate, and left his name to the Lake. His actual residence here being about as authentic as that of Pontius Pilate at the Alban Lake, we may rather search for the meaning of the term in "Mulla," "Malwa"—"high," which the tal is with reference to the Bhabur.

On the shingle at the upper end of Mulooa Tal, occurred a plant not yet quite in flower, which seemed to be Wallich's *Lobelia rosea*: 5 to 6 feet high: *L. pyramidalis* is to be seen in the glen of the Bukra below Nynee Tal: and in still greater abundance at 6500 feet on the Eastern face of Jagesur: it is exceedingly acrid.

December 26.—From Bheemtal over the Gagur Pass to Ramgar Bungalow, 12 miles north. The route keeps along the upper Basin of the Kooa Tal, and leaving Mahra village to the left, ascends to the head of the Shamkhet valley, 5700 feet above the sea (R. S.), remarkable as forming a depression of 3000 feet between the Eastern or Satchoolia, and the Western or Cheenur line of the Gagur, thus forming the lowest

passage from its south to its north face : it is drained by the Ninglat stream, which first flows West in the direction of the path to Nynee Tal, and then north to the Kossila : exactly the reverse of the course laid down in the Trigonometrical Map, where the engravers have drawn the Gagur continuously, and were therefore compelled to make their stream countermarch.*

From the Shamkhet valley the Almorah road ascends gradually to "Jureepanee,"—the root or source of the water—(one of the feeders of the Goula), and then very steeply for 900 feet to the crest of the Gagur Pass, 7200 feet above Calcutta by the observations of Lt. R. Strachey, but 7768 according to Webb, which, though a probable misprint for 7168, is adopted by the geographers of Berlin, who mark the elevation 7314 Paris feet. Captain Herbert states it to be 7121. The mountain is densely wooded with Rhododendron, Andromeda, Benthamia, Viburnum, *Pinus longifolia*, and fine *Quercus incana* and *dilatata*; but Bishop Heber was misinformed as to the Deodar, which does not grow here. His warranty of the scenery renders description superfluous; yet it is by no means equal to what one commands from many other points, as any of the peaks above the new road from the Pass to Nynee Tal, or from the Peoorah Bungalow. The traveller from the N. W. is struck by the nearness and boldness of the Himalaya—not a long curtain, but broken up into huge groups, masses, and pinnacles—the Punjchoola, the precipitous facades of Nunda Devee, and the colossal mass of Trisool, being right in front. The line between these and Budreenath is partially masked by the Chamee ka Dhoora, the Choor of Kumaon, a huge branch of the Trisool, attaining the elevation of about 13,500 feet. The nearer views comprise Binsur, Bhutkot, Doonagiri, Seyahee Devee, and the long blue, or in winter white, Doodootolee range, which fills the western horizon, and divides Kumaon from Gurhwal. To the south the prospect is limited: but by ascending the Western portal of the Pass, Bheemtal, with the exterior ranges, and a long expanse of plain and forest come into the field of view.

The Gagur Range has its appellation from one Gurg, who performed penance at the source of the Goula: those cool regions which are heaven to the Englishman, being hell to the Hindoo. Wilson explains Gurg to be "one of the ten principal moonees or saints, a son of Bráhma." Garggu means "descended from Gurg," and Gargee, the name of

the Saint's wife, is often applied to the Goula river. There is no decent proof, indeed, that any other wife ever existed, or that the Saint himself is not as imaginary a personage as his putative father. The Sanscrit root, gri, to sprinkle, to wet, seems to supply a more easy and natural derivation for the name, or "gurgur," making a gurgling noise; in allusion to the heavy rains which deluge the mountain and their result in innumerable streams. The Gagur is therefore the Indian Gargarus.

A pretty steep descent of 1300 feet down the north side of the mountains brings us to the Ramgar Bungalow, built on a plot of cultivated ground called Gujooteena, 5950 feet above Calcutta (R. S.) There is little space for the encampment of troops, but here, as at the other stages on this route, some shelter is provided in the way of substantial slated sheds, here called "Barracks," originally mule-sheds, which are available to passengers generally, and very useful in the cold and wet seasons. A Buniya is stationed at each Bungalow. Water, naturally scarce and distant, is brought down from the Pass to the Bungalow by wooden pipes. From its northern exposure, the climate here is colder than would be expected from the elevation. There is not much in the way of scenery; the bare, brown mountain of Lohakotee rising in front to perhaps 7500 feet, eclipses the snows: but to the S. E. the Sat-choolia or Sut-boonga, summits of the Eastern Gagur, are fine, not a little resembling Jukoo as seen from Elysium at Simlah, and (8450) nearly the same height.

From below Jureepanee to the crest of the Pass, and on the north side for 2200 feet down to the Ramgar valley, the Gagur Range is composed of syenitic greenstone, with occasional beds of clay and chlorite slate: at Jureepanee we also find masses of the identical syenite which has been erupted at the Binsur Muhadeo, and which Lt. R. Strachey informs me also forms the Surjoo base of that mountain. The Gagur syenitic greenstone extends eastward to the foot of Sat-choolia, and westward along the range traversed by the new road from the Pass towards Nynee Tal, which crosses the Ninglat stream at about 5500 feet, just where it enters the Shamket Gorge before mentioned: the flanks of this exhibit the greenstone much decomposed into rhomboidal fragments, finally merging, as at the Sat-choolia, into the quartzose rocks of Lurria Kanta. It thus forms perhaps the greatest formation of greenstone yet observed in the Himalaya.

The vegetation of the Gagur Pass is nearly identical with that of Nynee Tal : the following additions owe their existence most probably to an imperfect survey of the latter.

Astilbe rivularis.

Polygonatum multiflorum : Solomon's seal.

Leycesteria formosa : "Nulkurroo." "Sounjla."

Stauntonia latifolia and *angustifolia* : "Gophla."

Millingtonia pungens : "Gurdar." "Khurus."

Staphylea Emodi.

Eurya acuminata : "Dewra." From 3000 (Kotali Pass) to 7500 feet.

Oxyramphis macrostyla.

Ulmus virgata : "Chumburmuya."

Paris polyphylla.

Sempervivum.

Sedum multicaule.

Polygonum Sinense.

Ophelia paniculata.

Aplotaxis canescens.

Calanthe plantaginea. Hyacinth Orchis,

Gymnogramme caudata : "Ooneena."

Michelia Kisopa : "Bun-chumpa;" a large tree flowering September, October : Dr. Wallich says April, May, in Nepal.

In the shady dell at Jureepanee we have the *Gyrandra laurina*? "*Rukt-chundun*," "*Rutungulia*," before alluded too ; and here also the rocks and trees are covered with the beautiful *Clemates Nepalensis D. C. montana* of Don, flowering at mid-winter, each blossom with its involucrum. Its range appears to be from 6000 to 7000 feet, growing by and in streams—apparently a rare plant, as I have only found it here and at Devi Dhoora. Dr. Royle mentions choor, wrukta, &c. 9000—10,000 feet as its site, and May as its flowering season—referring most probably to the *Clemates barbatella* of Mr. Edgeworth.

The western face of the Sat-choolia group, from about 6500 ft. is covered chiefly with *Reeanjoak*, *Quercus lanuginosa*, reaching up to about 8000 feet : where it is superseded by *Q. dilatata*, fringing the northern crests and declivities : associated with ash, holly, maple, *Symplocos*, *crataegifolia*, *Millingtonia dillenifolia*, *Kadsura grandiflora*, *Marsdenia mollis*, and the clambering *Xanthoxylon oxyphyllum*.

Sopubia parviflora is in abundance at from 7000—8000 feet, above Borakot.

Towards the lower limit of *Quercus lanuginosa*, in dense damp forest near Jilwa Deo, at the foot of Sat-choolia, I came unexpectedly on several low plants of the Thakil Palm, *Chamaerops martiana* (vel *Khas-yana*), which I afterwards found of similar dimensions considerably north of this on the Bhatkot mountain. Should future search not bring taller specimens to light, the dwarf stature of these may be accepted as an indication that the tree attains hereabouts its western limit.

27th December.—To the Sat-choolia (or Sut-boonga)summits, a walk of three hours E. S. E. from the Ramgar Bungalow: the distance greatly exceeds the estimate, consequent on the suppression from below of several long and comparatively bad ridges. No guide being procurable, we went to work bull-dog fashion, descending to a branch of the Borakot stream, and then breasting an almost precipitous acclivity. A much easier way is to ascend a mile or more towards the Gagur Pass, and then strike off eastward, through beautiful forests to the *col*, east of the rural shrine Jilwa Deo, where at the termination of the green-stone, elevation 6800 feet, the routes meet. Hence to the summit, the ascent is somewhat difficult, the huge crags and cliffs of quartz rock, which constitutes all the upper portion of the mountain, offering considerable obstacles. The western summit, elevated 8450 feet (R. S.), or about 100 less than Cheenur, consists of a ridge level for a few hundred yards from north to south, but of no width: about half an hour's walk, east, and divided by a neck depressed 150 to 200 feet, is a more roomy summit, apparently of equal altitude, devoid of timber, and wholly overgrown with *Cherayuta* (*Ophelia cordata* and *purpurascens*); on this is a cairn and mast of the Trigonometrical survey.

There is no water on the western face of this group for the last 3000 feet: but it probably would be found at no great distance down the woody glen facing the north.—Marks of wild animals were abundant, hog, deer, &c.; several surrow, ghoorul, and kakur, showed themselves, as well as the foot prints and other vestiges of tigers, which roam all over Kumaon in the hot and rainy seasons: the mountaineers firmly believe them to be very regular in their devotions to Devee on the high places.

Choola and Chooda, or Choore, are identical terms, signifying 'head,' 'crest,' &c., from *chool* to elevate, and are distinct from *choolee*, a fire-

place; yet it seems to have been chiefly from this misapprehension, aided by an occasional riband-like wreath of cloud extracted from the snow by the sun, that the Punj-Choola has been reputed the seat of volcanic action. The only evidence of this hitherto known in the province, is that arising from the recurrence of frequent, but happily slight shocks of earthquakes.

Sat-choolia and Sat-boonga denote either the pure or the seven summits: they overlook an immense expanse of the Himalaya and of Hindoostan, and are composed exclusively of quartz rock, of which the strata dip to the N. E. and form tremendous precipices to the S. W., amongst which are the springs of the Goula. The range is continued round a deep bay to the N. E., in which direction is the Motesur or Motchur summit, also called Motee Pathur, 7782 feet, of which the rock is mica slate, the dip of the strata identical with that of Sat-choolia. The Mussooree and Landour rocks are all tilted up in the same direction here at Sat-choolia, as well as at Mussooree, this is probably due to the outbursts of trap rocks to the S. W. The parallel dip of the strata in the higher mountains noticed by Herbert and others, would appear to depend, in like manner, on the line of granitic eruption which, inside the Gagur, extends through Kumaon from N. W. to S. E. nearly; still higher up, but equally parallel, is the great range, in which the chief rivers have their sources; between these, running S. W. and even south, are the loftiest summits of the Himalaya, the highest of which, Nunda Devec, with its precipitous and apparently stratified front towards Almorah, seems built up on the same model as the lower ranges. The whole of the rocks of the main chain, however, can scarce be stratified: my friend Major Sampson, found the blocks brought down by the Vishnoogunga Glacier above Budreenath to be a normal grey granite. Moreover in the Jagesur range, near Almorah, which attains the elevation of 7721 feet, the rock (mica-slate) dips to the plains. In the case of the Bumouree ranges, where the sandstone strata rise steeply towards the plains, where not a vestige of any up-heaving substance remains, but on the contrary, the land is exceedingly low, it is difficult to account for their position, except by the supposition that the subterranean force acted in a line with a very oblique inclination to the surface.

The descent from Sat-choolia may be varied from the ascent by

dipping down an exceedingly steep cloof on Borakot village, 3000 feet beneath; it has the disadvantage of a subsequent ascent of 1000 feet to the bungalow.

December 28th.—From Ramgar Bungalow to Peoorah, 9 or 10 miles. The road dips 1000 feet to the level and rather open valley of the Ramgar stream, on the south or left bank of which was the original bungalow, a singularly unhappy position, exceedingly hot in summer, and, till *warmed* by the sun, as intolerably cold in winter. So cold are these vallies at night, that at Hawulbagh, only 4000 feet above the sea, and comparatively open, many plants are killed by frost, which escape at Almorah, 1500 feet higher.

A mile or so east of this, the road crosses to the north bank by an iron suspension Bridge (elevation 5050 ft. R. S.), 200 feet above which stands the village of Naikena or Ramgar, consisting of about 50 houses, as neat and correct in externals as the character of the inhabitants is, in our eyes, infamous. The place is the property and residence of a community of hereditary and, in their own estimation, high-caste Paturs, who keep up strong establishments at Almorah, Khilputec, &c. tending in no small degree to the demoralization of the province, and inflicting serious injury on the health and discipline of the troops in garrison. Nor are they content with Kumaon, for each cold season, this deplorable sisterhood detach some of their numbers to the various cities of Rohilkund. The female children are all brought up in the profession of their mothers; the boys become *Naiks*, as the men of the village are called, who, in case of deficiency at home, get their wives from the iron-masters of Agur: no respectable family would think of an alliance with them: and Venus, as of old, marries with Vulcan.

From the bridge, there is rather a long ascent to what is called the Ramgar Gallery, when the road keeps for two miles the S. E. face of the hot and bare Lohakotee mountain, which rises fully a thousand feet higher: immediately beneath flows the Ramgar in a narrow and precipitous gorge formed by the Lohakotee and Sat-choolia mountains. Its head waters are in the deep recess formed by the latter and Motesur, on leaving which it irrigates the broad, undulating, and cultivated vale of Agur, possessed by a race who for ages back have worked the iron mines from which the Lohakotee mountain has its name. The old

mines are on the ascent above the village of Ramgur; those wrought at present lie more to the west, abreast of the bungalow. These men also work the iron-mines of Khetsari near Lohba in Gurhwal, whither they annually emigrate in November with their families and cattle. The mines on the Punar near Ramesur, and I believe those along the Ludheca, between Doorga Peepul and Deo Dhoora, are also in their hands. It is curious enough that Kirkpatrick calls the miners of Tambakan, a similar locality in Nepal "the Agrye caste or tribe." The name may be connected with the Agurwals of N. W. India, and it is certain that in the Aguri-kars, or artificers of Agur, Jacob Bryant would have infallibly discovered the remnant of the Egregori, the primeval instructors of savage man in metallurgy and husbandry.

About Ramgar village commences the Mica slate formation so general thence northward - on the Gallery, it is blended with strata of blue crystalline limestone, the whole dipping N. E. At the east end of the Gallery is the Deodara Pass, 6346 feet above Calcutta, on the neck which joins Motesur to Lohakotee. Here Almorah is first seen, backed by the snows, but the view is speedily lost, for the road now makes a second deep dip into the glen of the Deodar stream: this rises in Motesur, and flowing north, joins the Kosilla above Munrus. Its slopes exhibit a rich expanse of cornfields, with the villages Kilar, Banj, &c. a cheerful contrast with the gloomy woods of the Gagur. Tradition has it that valuable treasures are buried where the road crosses this brook: it is more certain that a wearisome acclivity must be breasted to the Laldana Binaik, about 6000 feet high; this pass was formerly guarded by a petty stone gurhee to the left, but is just now entrusted to the protection of the Deotahs, whose good will is secured by a number of paltry shrines, where the bushes are plentifully decorated with rags of every age and color. The ravages of tigers, since mitigated, led to this display of piety; but the animals still frequent Motesur mountain immediately above.

Peorah Bungalow, elevated 5800 feet (R. S.) is nearly a mile east of the Laldana Binaik, and 150 to 200 feet lower: being on the northern face of the mountain, it has little sun, and is a chilly spot in winter. About 5 miles distant to S. E. is the Motesur summit, 7782 feet, covered with *Quercus dilatata*, which shelters one or two low shrines of Muhadeo, Symdeo, &c. On the crags a little below are

certain marks which the people believe to be the footprints of elephants, horses, camels, &c., the army of a certain, or rather, uncertain god; who, wishing to pass this way, was resisted by the demon of the place: this latter obtained "moksh," emancipation from existence, by being quouted down amongst the Aguris: and hence they say comes Motesur or Mooktesur. The Motia Patthur is said to be distinct, lying between this and Devee Dhoora.

The vegetation about the Ramgur valley consists of *Craniotome versicolor*.

Pupalia sequax.

Rubia cordifolia.

Marsdenia Roylei.

Jasminum dispermum.

Mimosa rubicaulis (its upper limit.)

Bryonia scabrella.

The coppice about Peorah exhibits the usual shrubs, with *Spiraea cuneifolia*.

Rhus semialata: "Dukmeela."

Rhus vernicifera: "Goor-bhuliou."

Rhus parviflora: "Runnel," (Highest limit.)

Benthamia fragifera: "Bumoura."

Elaeagnus arborea: "Gheewaee."

Myrica sapida: "Kaephul."

Cotoneaster affinis: "Rous."

Alstonia lucida: "Doodhee."

Quercus annulata: "Phuliant," "Funiyat." Upper limit 6000 ft.
lower 2000.

Pardanthus Sinensis: to 7700 feet on Motesur.

Hedychium villosum.

Hedychium tenuiflorum? Between Ramgar and the Gallery, flowering in August, and discovered here by Moonshee Murdan Alee* of the Seharunpoor Botanic Garden.

* This very intelligent and respectable Syyud, the first of his race, perhaps, who addicted himself to Natural History or any useful knowledge, and in whose honor Dr. Royle established the genus *Murdannia*, has, under the occasional instruction of Messrs. Royle, Falconer, and Edgeworth, his masters and mine, attained a considerable proficiency in Botany, and has compiled a Hindooostane work on the subject, containing a

The warm exposure of the Ramgur Gallery exhibits the following plants :—

Amphiraphis cuspidata.

Osyris nepalensis : “Bukurdhura.” “Bukurja.”

Hypericum cernuum : “Ulooaa-bena.”

Thalictrum rupestre.

Leea aspera : “Koomalee.”

Glochidion bifaria : “Mowee,” “Byr-mowce.” “Bukulwa.”

Cedrela serrata : “Dul,” “Dula.”

Vitis rugosa : “Assoujia.” “Puhur-phoota.” The first referring to the season, Sept.-Oct., when the grapes ripen, which are edible; the second means “mountain-splitter,” from the habitat of the plant. It is also common on the crags of Motesur, Bandunee Devee, Binsur; and is the same which in J. A. S. March 1847, p. 242, is termed *V. macrophylla*. But there is no need for a new name; it is well-described by Dr. Wallich in the Flora Indica, with this exception that (in Kumaon at least), it does not inhabit “mountain and other forests,” but open warm crags. Wight and Arnott (Prodromus 131), and Royle (Illustrations, 145), identify it with *V. lanata*, Roxb. The two plants, however, are perfectly distinct, and never confounded by the people here. *V. lanata*, “Peorain,” celebrated amongst them for the abundance of sap yielded by its stock in spring (as *V. latifolia* and *rosea* are in the Bhabur) chiefly affects the warm vallies, from 4000 to 5000 feet, flourishing by the streams, and climbing over high trees. It flowers in May, with pale yellow petals, cohering at the apex, and in that form, heaved off by the stamens.

V. rugosa, on the contrary, prefers the most exposed crags, over and amongst which it creeps but never climbs, at from 5000 to 6500 feet or more, where *V. lanata* becomes rare. The stems rarely exceed six feet in length, and, as Wallich observes, the leaves rival in size those of the common Burdock or the Rhubarb. The flowers do not appear till

general introduction to the study, followed by a detail of the orders and genera, after the Natural System, comprising most of those indigenous to the upper provinces of India and the Himalaya. The work still languishes in MS. the expenses of printing being beyond the author's means. With some previous supervision, it is deserving the attention and patronage of the Asiatic or any other Society interested in the progress of Botany in India, amongst the Indians.

July, the colour deep red, the petals spreading, distinct ; and scarcely to be distinguished from those of *V. tomentosa*, "Chuppertain," a resemblance noted in the *Prodromus*. The three species may be compared growing in company on the Ramgar Gallery, though *V. lanata* and *tomentosa* are rather rare in this locality.

It is an agreeable task thus to vindicate the fair fame of one whom it has recently been the fashion in Bengal to depreciate with a perseverance which would be amusing were it not malicious and dictated by personal hostility. The Doctor gives a description ; it is rejected : he gives none ; and is held up to our admiration with a "sine charactere !!!" Truly may he exclaim, we have piped unto you, and ye have not danced, &c.

In the vicinity of Peorah, and generally over similar ground in Kumaon, two forms occur, the tender fronds of which are commonly eaten, and are sometimes brought to market. One, "Kootra" is the *Nephrodium eriocarpum* ; the other "Lingra," "Lioongra," "Lecoor," (a very difficult sound) is the *Asplenium polymorphium* ; the first coming unto season in spring, the second in autumn.

Cinnamomum albiflorum : "Dalcheenee," "Kikra," is a common plant in the valley of the Koomnia below Peorah.

December 29th.—To Almorah, 9 or 10 miles. There is a long descent of about 1800 feet to the Koomnia river, which is passed by the Synj Iron suspension Bridge ; then a rise of perhaps 1000 to the Dheekot Binaik, on the spur from Roulakot, a bluff point connected with Bandunee Devee, and about 400 feet lower :—then a second-descent to the Suwal (Salmulee or Semul) river, which is crossed by the "Lat" Iron Suspension Bridge : and lastly, a tedious, rocky, very bare, and in Summer exceedingly hot ascent of 1600 feet to Almorah, by no means calculated to impress the visiter very favorably in the first instance. The rocks are quartz, mica slate, (with freestone beds in the Huree Doongree,) gneiss, and finally granite, which forms an entire mountain S. W. of the station, and has apparently lifted up, and in some places, contorted the others to a remarkable degree : to the south, indeed, the strata appear to dip under the granite : they also contain in this neighbourhood the quartz dykes supposed to indicate the action of granite. The quarries of micaceous and quartzose rocks supply excellent materials for building and roofing.

Approaching Almorah in this direction during the hot season, multitudes of large lizards may be observed basking on the rocks, conspicuous by their cobalt-blue legs, and the sure index of a broiling temperature: indeed, in the low vallies, where they rival the Gosamp in size, the climate in May and June differs little from the fabled one of the Salamander. These reptiles are generally considered to be insectivorous; here, however, they also devour grass and other herbs with avidity, and are very destructive in the gardens.

The town of Almorah in Purgunna Baramundil has already received its meed of description from Bishop Heber and Mr Batten, to which I will only add one or two remarks on the animals, &c. of the vicinity. Mr. Hodgson, I think, tells us that the Jackal (here called Shial), seldom or never appears in the Himalaya; this is by no means true of Almorah, towards which they may be seen stealing every afternoon to pay their attentions to the poultry-yards, and goats; the handsome hill fox, "chooria-shial," is also not uncommon, and though Captain Thomas asserts the reverse, is, or at least was to be seen about Simlah. I observe also that Mr. Ogilby, in Royle's Illustrations, concludes that the domestic Ass has not been introduced into any part of these mountains; they are in common use as beasts of burden at Kanum and Soongnum in upper Kunawur. Leopards are numerous at Almorah, and levy heavy contributions on the flocks, the dogs, and the poultry; bears only approach during the autumnal harvest: tigers are never now known to come within ten miles of us. The Hare, Susoo, is not very common. Snakes and scorpions are common, some of the former above 6 feet in length, but generally harmless, though much dreaded by the people; in two years' residence I have never heard of an accident; but at Hawulbagh the Cobra is well known. A plant, "Guroor-bootee" is considered a cure for the bite: what was pointed out is Barleria ciliata.

Amongst birds, the common Plover or Peewit of the plains, *Vanellus Goensis*, is frequently to be seen; the people know it by the name Tishta; and, in common with their low-land neighbours, have the odd idea that it sleeps on its back with its legs upwards to prevent the sky from falling on it. No easy matter, with so watchful a bird, to bring to the test of actual observation, and hence perhaps the origin of the belief.

The highest point of Almorah, Fort Moira, is about 5577 feet above Calcutta; the general level of the ridge being from 50 to 100 feet lower. This elevation ensures a temperature sufficiently high in summer and autumn to induce the visits of the Firefly, the Cardinal, Rocket, and Mango birds, the Hoopoo, the Myna, flights of a beautiful Perroquet, the king of the crows, Bulbul, Shrike, the loud-wailing "Neoula," and other denizens of the plains, who here meet the Goldfinch, Skylark, Cuckoo, Black-bird, Field-fare, Jays, Tomtits, and Wagtails of several species, the pretty Certhia himalensis or Wall-creeper, the Woodcock (Simkookra), and other natives of the north; the whole kept in order and number by a very strong force of ravens, owls, hawks, falcons, kites, eagles, (a fine black eagle,) vultures, and demi-vultures.*

The phenomena of the vegetable kingdom are analogous, (though in part due to the agency of man,) denoting a middle term, where many tropical plants will not live or flower, from the cold, while the alpine ones either perish, or refuse to flower, from the heat. The climate seems very congenial to many of those from the more temperate regions of Central America. We have *Butea frondosa*, *Cordia myxa*, *Ficus religiosa*, *Grislea tomentosa*, *Sapindus acuminata*, *Lagerstroemia indica*, *Cedrela Tuna*, *Melia azadirach*, *Acacia Farnesiana*, *Cassia aurata*, *Mitchelia champaca*, *Yucca gloriosa*, *Ricinus communis*, *Musa sapientum*, *Eriobotrya japonica* (which, however, never matures its fruit), associated with *Populus ciliata*, *Pavia indica*, *Alnus obtusifolia*, *Juglans regia*, *Cedrus deodara*, *Cupressus torulosa*, *Pinus longifolia*, *Cerasus pudum*, *Pyrus variolosa* and *domestica*, *Crataegus crenulata*, *Armeniaca vulgaris*, *Clematis*, *Thymus*, and other northern forms.

Such data, fortified by experience, will enable us to rate at its proper worth the colonization cant which so often fills the gazettes, combined with the most exaggerated pictures of Himalayan resources, and the most chimerical schemes for railways, in a country where we are only

* *Gypætos barbatus*, "Gidh," the common vulture, is a corruption of the Sanscrit *Gridhra*, which is our own word greed, greedy. Several of the birds enumerated are only to be seen here during the winter: the Cuckoo, "Hupoo" makes its appearance in the latter half of March: it is an interesting point, perhaps still undetermined, to detect the winter habitat of this bird: it would appear to be in the south. I have heard them as far down as Cawnpore.

The *Melia azedarach* (Betain of Almorah) agrees with the *Bukayun* of Meerutt, &c. the ridges of the nut being somewhat less prominent.

too happy to find any roads at all. In sober truth, the resources of the mountains are not many, and are already as much developed as the nature of the country will admit of. Consequent on the cost of transport, the timber, tar, iron, hemp, madder, &c., cannot at any remunerating price, come into competition with the water borne articles of Europe, and other maritime lands; or the supply already equals the demand. The soil, except in the low vallies where the European colonist cannot exist, is generally poor, besides being pre-occupied, and often exhausted, by the aboriginal population. Of the feelings with which these would regard any extensive immigration of agricultural Europeans, we may judge by the dissatisfaction with which they relinquished the comparatively trifling lands required for the Tea plantations. The fine tracts of rich meadow, which flank the Snowy Range, are too remote for settlers, and are too high and too cold to ripen grain.

Then as Russia has been termed a despotism tempered by assassination, so the Himalayan climate is a tropical one tempered by thunderstorms. It is certainly less salubrious than is commonly supposed, and seldom so cool as to admit of European out-door labour. Everywhere we encounter miserably diseased objects amongst the natives—much to be ascribed to filthy habits, no doubt:—and up to 5500 or 6000 feet, the amount of sickness amongst Europeans, though not of a serious description, is considerable, and of a nature which singularly indisposes and unfits the subject for occupation. Such, too, is the power of the sun at *all* elevations, from April till October, between 9 A. M. and 4 P. M. that Europeans can rarely with impunity brave its rays.* The mean annual temperature at 7500 feet elevation is nearly that of Lon-

* On this point, Professor Forbes furnishes us with some results very instructive to those who think that by escaping to the Himalaya, they also escape the Indian sun, (supplementary Report on Meteorology, in the Report of the British Association for 1840.)

"Saussure seems first to have thought of comparing directly the intensity of solar heat at the top and bottom of a mountain: * * * * and, by experiments on the Cramont, to the south of Mont Blanc, he actually proved the increased intensity of the solar rays as we ascend, notwithstanding the diminution of temperature." The Professor himself, by "comparative experiments at the top and bottom of a column of air 6500 feet high, of known density, temperature, and humidity, under the most unexceptionable circumstances in point of weather" found the loss of solar heat vertically traversing the atmosphere to amount, at the level of the sea, to 29 per cent.: "a near agreement with the 32 per cent. independently determined by the method of Bouguer and Lambert with the same

don : but the fact that few of the trees indigenous at that altitude can stand an English winter, points to a signal difference of conditions in the distribution of Himalayan heat and moisture. Dr. Royle well observes, after the astronomers, that, in advancing north from the equator, the sun passes over 12° in the first month, 8° in the second, and only $3\frac{1}{2}^{\circ}$ in the third ; and that hence, from his longer presence there, and the greatly increased length of the day, the heat is more intense at the tropic than at the equator : at the latter, the sun is more or less vertical for about six days only ; at the latter for nearly two months. The distance of the Himalaya from the northern Tropic is not great ; and where we have a southern exposure, is more than compensated ; *there* indeed, the sun's rays strike vertically with intolerable power, augmenting in the ratio of our ascent, so that one is absolutely scorched while walking on a glacier. What a contrast also between the generally serene brilliant sky, and extremely dry atmosphere of the Himalaya during eight or nine months of the year, and the cloudy canopy which so generally rests over the British Islands ! The sun's arrival at the Tropic of Cancer is marked here by that of the rainy season, when the previously dry atmosphere is suddenly, and for three months, saturated with moisture, with a sun potent enough to knock down an ox, when he does show himself, which is not seldom. During this period, one is alternately baked and chilled half a dozen times during the twenty-four hours, and that not in the low confined vallies, but on perfectly open ridges such as Almorah, where it is, consequently, a matter of some difficulty to adjust one's clothing to the frequent fluctuations of temperature, the annual change of dress which Mr. Fortune describes amongst the Chinese being here diurnal. The result at Almorah, Kussowlee, &c., appears to be as much, though not so dangerous sickness as in the

instrument (actinometer) at the same time :" again : " estimating the loss of radiant heat by a *vertical* passage through the atmosphere at only 25 per cent. ; at an angle of elevation of 25° , the force of the solar rays would be reduced to a half, and at 5° to one twentieth part," from the varying thickness and transparency of the atmosphere. Hence the necessity for shelter except in the morning and afternoon.

" The increased intensity of the sun's rays at great elevations supplies the probable reason (suggested to me by Lt. R. Strachey) of a phenomenon noted on a former occasion, viz. that the seeds of the same species of plant ripen much earlier on the lofty passes of the Himalaya than at their base.

much abused plains, the misfortune of which is that one cannot breathe there.*

If the above be a true view of the case, it appears chimerical to hope that the Himalaya can ever maintain an independent body of colonists, such as might supersede the necessity of drawing recruits from Europe, or such as, on any emergency, could be brought down to act in the defence of the Lower Empire. This is a very different question from that of the fitness of the mountains for sanatory settlements occupied by those in the service of Government, and whose means of subsistence are drawn from the Plains: that, indeed, is no longer a question: a hundred applications for every vacant appointment in the mountains attest the "deep damnation" of a life in Hindooostan.

The following list includes most of the plants found at Almorah and Hawulbagh, from 4000 to 5500 feet above the sea.

Anemone vitifolia.

Clematis grata : "Ghurmulee."

Clematis velutina : "Ghuntiali."

Clematis Buchananiana : — rare.

Ranunculus laetus : "Dhynia."

Ranunculus sceleratus : "Sheem," (any marsh plant.)

The Sooruj-jal, or "water-sun" of northern India.

Ranunculus arvensis : "Ainwa."

Delphinium Ajacis, naturalized.

Delphinium pauciflorum : "Moonila." The root, chewed on Sunday, is a popular remedy for tooth-ache.

Thalictrum foliolosum : "Pengla-juree," "Chulnia."

Papaver glabrum, (Royle;) Cornfields : "Tukoovia," often perfectly glabrous, but sometimes stem, peduncle and calyx are extremely hairy.

Argemone mexicana : "Kuntela," rare.

Fumaria vaillantii : "Khyrooa," considered to be injurious to cattle.

Corydalis paniculata : (N. S. Edgeworth) at 3700 feet, about Binsur Temples.

* Having lately adventured some observations on the tidal currents of the atmosphere in these mountains, and endeavoured to show why the day-stream is from the Plains, and why the nocturnal one should be the reverse, I may here add that subsequent observation, during the hot season, proves the early morning breeze to be almost invariably from the East, or within a few points of it: but of a force much inferior to the other, which reaches us up the gully of the Kosilla.

- Kadsura propinqua* : " Sindrain."
- Jasminum dispermum* : " Soormalee."
- Jasminum grandiflorum* : " Jahee." " Chumbelee."
- Foeniculum panmoriun* : " Sonp," " Sonf," " Fennel." Cultivated.
- Bupleurum*.
- Hydrocotyle tenella*, (Don.)
- Coriandrum sativum* : " Dhuniya." Cultivated.
- Heracleum*.
- Œnanthe ?
- Anethum sowa* : " Soa." Cultivated.
- Ptychotis* ? *Pimpinella* : " Dhunjuree." Edible root.
- Hedera helix* : " Banda." " Ivy." From 2500 to 9000 feet.
- Berberis asiatica* : " Kilmora," passim.
- Ampelopsis himalayana* : " Chuppurtung."
- Vitis parvifolia* : " Berain."
- Vitis lanata* : " Poorain."
- Vitis tomentosa* : " Chuppurtain."
- Vitis rugosa* : " Assoujia." On Bandunec Devee.
- Leea aspera* : " Koomalee," " Koormalee."
- Cissus capreolata*.
- Olax nana*.
- Pittosporum eriocarpum* : rare.
- Epilobium lœve* and *cylindricum* ? Don.
- Circea intermedia* : (7000—8000 feet, Binsur.)
- Œnothera nocturna, longiflora and rosea : naturalized.
- Poivrea Roxburghii*.
- Combretum nanum* : " Phursia."
- Osbeckia stellata* : " Kookur-makree."
- Osbeckia angustifolia*.
- Punica granatum* : " Darim." The rind of the fruit " Kooshiala."
- " Nashpal."
- Deutzia staminea* : " Moonetee."
- Viscum album* (*stellatum*, Don.) " Banda."
- Trichosanthes palmata* : Indrain."
- Bryonia umbellata* : " Gwala-kakrec."
- Bryonia scabrella*, and *Nepalensis* ?
- Begonia picta*.

- Lepidium sativum* : " Halim." Cress. Cultivated.
- Nasturtium officinale* : " Peeria halim." Water-cress.
- Alyssum maritimum* : naturalized.
- Sisymbrium sophia*. } " Joua-ghas."
- Arabis Thaliana*. } Abundant in the cornfields.
- Thlaspi arvense*. } " Daupreca."
- Arabis longisiliqua* : N. S. Edgeworth, on walls, &c. 4000 to 6000 feet. " Rai-ghas."
- Capsella bursa-pastoris* : passim.
- Cardamine impatiens* : " Shelia." " Shevia." Passim.
- Raphanus sativus* : " McCollee." Cultivated.
- Viola cespitosa* and *aspera* : (canescens, Wall.) The first down to 2000, the last to 3000 feet.
- Drosera lunata* : " Mukhajlee." Sundew. 4000—8000 feet.
- Passiflora foetida* (or *cerulea*?) " Sunkhya." Naturalized.
- Hypericum cernuum* : " Ulooabena."
- Hypericum uralum*, *Nepalense*, *Japonicum*.
- Polygala crotalariaoides*, *elegans*, *glaucescens*.
- Linum trigynum* : " Peoonra."
- Linum usitatissimum* : " Ulsee." Occasionally cultivated.
- Bombax malabarica* : " Semul."
- Riedlea corchorifolia*.
- Malva rotundifolia*.
- Malva mauritiana* : Gardens. " Til-chonee."
- Urena lobata* : " Soojia."
- Sida rhombifolia* : " Bhao." " Kala-bulec."
- Sida cordifolia* and ——.
- Lagunea lobata*.
- Hibiscus aculeatus* : " Fields."
- Abelmoschus pungens* and *cancellatus* : " Kupusya."
- Corchorus acutangulus* and ——.
- Triumfetta oblongata* : " Leshwa." " Koomuria."
- Triumfetta angulata*.
- Grewia oppositifolia* : " Bhengool."
- Grewia asiatica*, var. *nana* : " Phursia."
- Ammannia rotundifolia* : " Durmcea." Very common.
- Ammannia sessiliflora*.

- Grislea tomentosa* : "Dhoula." To 6000 feet.
Cedrela serrata : "Dhul."
Cedrela tuna : "Toonnee."
Rhamnus virgatus : "Chudooa."
Sageretia oppositifolia : "Uglaiia." From 2000 to 5000 feet.
Berchemia floribunda : "Kala-lug."
Ceanothus flavesiensis : "Ghont."
Euphorbia pentagona : "Sehoond." To 6000 feet.
Euphorbia angustifolia : "Muhabeer." "Doodhila."
Euphorbia hirta and *involucrata*.
Emblica officinalis : "Amla."
Phyllanthus parvifolia, (Don.)
Phyllanthus retusa : "Dhunee."
Phyllanthus leucopyrus : "Ainta."
Phyllanthus urinaria : "Seeahee."
Glochidium bifaria : "Mowee." "Bukulwa." "Byrmoua."
Cluytia ?
Rottlera tinctoria : "Rooenee." Upper limit 4000 feet.
Evonymus Hamiltoniana : "Ugnoo."
Staphylea Emodi : on Siyahee Devee.
Portulaca oleracea : "Loonia." "Koolfa."
Gypsophila vaccaria : cornfields.
Silene Falconeriana : (*S. armeria* naturalized.)
Arenaria serpyllifolia, and *muralis* : N. S. Edgeworth.
Leucostemma angustifolia : on every terrace-wall.
Stellaria media.
Schizotechium crispatum : Siyahee Devee.
Cerastium triviale, var. *glomeratum*.
Drymaria cordata.
Polyarpaea corymbosa.
Ruta alpina : "Oopuniya-ghas." Descends to 5000 feet.
Xanthoxylon hostile : "Teemoor." "Tejbul."
Xanthoxylon tomentosum : "Seemoor." N. S. Edgeworth, 6500 feet, north face of Bandunee Devee.
Geranium Nepalcense and *bicolor*.
Impatiens umbrosa.
Tropaeolum majus : naturalized.

**Oxalis corniculata* : "Chulmoree."

Coriaria Nepalensis : "Mukola."

Photinia dubia : "Gur-mchul." "Soond."

Pyrus variolosa : "Mehul."

Crataegus crenulata : "Geengaroo." Passim.

Cotoneaster microphylla : "Gurree."

Rosa Brunonii : "Kooja."

Rubus rotundifolius : "Heesaleo." Passim.

Rubus tiliaceus and *lasiocarpus* : "Kala-heesaloo."

Spiraea cuneifolia : "Jhar."

Spiraea chamædrifolia.

Fragaria indica.

Potentilla ——, 2 species.

Cerasus pudum : "Puya."

Cydonia vulgaris : "Bihi."

Armeniaca vulgaris : "Chooaroo." "Zurdatoo."

Persica vulgaris : "Aroo." Does not ripen its fruit.

Prunus : two cultivated species : "Ludakh" and "Bhotiya-budam."

Prinsepia utilis : "Jhutela," "Dhutela." Passim, and in flower all the winter : the name means "tangled."

Crotalaria *sericea*, *anthylloides*, *alata*, *prostrata*, and *albida* : all known as "Goongree." The claws and lower side of the wing and Kul petals of the first are copiously ciliate : otherwise the name is very inappropriate.

Melilotus parviflora.

Lotus corniculatus : on every wet bank.

Trifolium repens and *pratense* : introduced.

Trigonella foenum-græcum : "Methee." Cultivated.

Indigofera atropurpurea : "Kala-sukena," or "Sukna."

Indigofera pulchella and *Dosua* : "Sukena."

Indigofera —— "Moos-sukena." A low shrub.

Indigofera prostrata.

Indigofera hirsuta : "Naneet-goongree :" "little Crotalaria."

* Moonshee Murdan Ulee gave me a specimen of *Oxalis acetosella*, gathered somewhere, he said, in the Himalaya, and was surprised that Dr. Royle had not mentioned it.

† "Nana :" this word, neither Hindoo nor Sanscrit, is the common Kumaoon term for "small :" a curious coincidence with the Latin. The Khuriyas of this province say that

- *Robinia macrophylla*: "Goujha." Upper limit, 4000 feet.
- Pisum arvense*: "Kulon." "Kolai." S. *Kulayu*: "generating wind."
- Vicia sativa*, var. *angustifolia*: "Koor-kosha."
- Lathyrus angulatus*, *aphaca*, and *Sativus*: "Mutur." The first "Goor-kosha."
- Ervum hirsutum*: "Kooree."
- Zornia angustifolia*.
- Æschynomene indica*.
- Smithia ciliata*: very common by streams.
- Alysicarpus vaginalis* and *bupleurifolius*.
- Uraria alopecuroides* and *picta*.
- Desmodium gyrans*, *triflorum*, *parvifolium* and *polycarpum*.
- Lespedeza elegans*.
- Oxyramphis macrostyla*, *himalensis*, and —— .
- Dumasia villosa*.
- Mucuna pruriens*: "Goncha."
- Erythrina arborescens*: "Roongura :" 4000 to 6500 feet.
- Dolichos —— : "Moos-kela." A procumbent species with deep-red flowers, and edible tuber.
- Cantharospermum pauciflorum ? and —— .
- Eriosema —— . "sp. very common on Simtola Hill : 5000—6000 feet.
- Phaseolus scaber*: "Guhutia," Sweet Pea.
- Phaseolus angustifolia*: "Bun-moong."
- Rhyncosia ?
- Flemingia semialata* (to 6000 feet) "Blutooa :" and sp. resembling *procumbens*.
- Dalbergia robusta*.
- Edwardsia mollis*: "Puhur-goongree."
- Cesalpinia sepiaria*: "Kurounj." "Agla."

their dialect comes closest to that of Bhojpoor in Behar. Kumaon may have been colonized by that warlike district.

A "Khus" dynasty is said to have expelled for some ages, the Rajpoot line (from Jhoosee near Allahabad) which, founded by Somchund, reached down to the Gorkhalee conquest. The names of these autochthonal chiefs, which are still in common use, are, the last two excepted, not at all Hindoo : they are given thus : Beejud, Jeejud, Jajud, Jud, Kaloo, Kulsoo, Jahul, Mool, Goonakur, Keeda, Nugoo, Bhagoo, Jypal, Soupwel.

- Cassia tora, absus, purpurea*: "Bonar."
- Cassia amœna, pumila, wallichiana, and dimidiata*: "Silputiya."
- Bauhinia variegata*: "Khwyral." 6000 feet W. face, Kaleemuth.
- Acacia mollis*: "Burou."
- Saxifraga ciliata*: "Silphora."
- Tillæa pentandra*.
- Kalauchoe varians*: "Noonoo." "Bukulpura"
- Sedum adenotrichum*.
- Rhus parviflora*: "Runnel." "Rui-toong."
- Rhus velutina*: "Teong."
- Rhus semialata*: "Dukmeela," "Dutmeela."
- Rhus vernicifera*: "Bhalion." "Goor-bhalion."
- Rhus acuminata*? "Kakursinghee," i. e. "crab's claws:" from the long curved excrescences. The timber is exceedingly beautiful.
- Alnus obtusifolia*: "Oodeesh."
- Urtica parvifolia*: "Shishona." Buffaloes are fed on the bruised leaves and shoots, which are also the favorite food of several caterpillars.
- Urtica heterophylla*: "Awa." "Bichhoo." The *Babur* of Simlah: the fibre makes good cord and twine, which however perish speedily from moisture.
- Urtica pentandra*: "Jephul-juree."
- Bæhmeria salicifolia*: "Tooshiaree" or "frosty-leaved."
- Bæhmeria platyphylla* and *rotundifolia*: "Gurgela."
- Procris punctata* and *peduncularis*: "Souchula." "Golka." Used as a vegetable.
- Cannabis sativa*: "Bhung," "Bhang." Forms a rank and offensive jungle, and should be eradicated in the vicinity of the town. It is cultivated in Gungoleehath and other parts of the province.
- Humulus lupulus*: Hop. Flowers well at Hawulbagh, but not at Mussooree (Dr. Jameson.)
- Morus serrata*: "Kemoo."
- Ficus laurifolia*: "Doodhla."
- Ficus macrophylla*: "Timla." }
- Ficus rotundifolia*? "Beroo." } Edible.
- Ficus ovata*? (Don.) "Bedoolee." Creeps extensively over rocks and trees: perhaps *F. Luducea*, Roxb. Edible.

Ficus Luducea? "Kabra."

Ficus chincha? *foveolata?* "Kismira." "Kewnia."

Ficus cunia: "Kewnia."

Ficus.

Celtis tetrandra: "Khuruk." Grows to be a large tree, much planted about the villages, as the boughs fork conveniently for the stacking of hay, grass, straw, &c. The male flower is frequently pentandrous. Flourishes to 7000 feet at Simlah.

Myrica sapida: "Kaephul." The fruit is brought in large quantities to Almorah, and the bark is exported to the Plains as a dye and medicine.

Salix tetrasperma and _____ : "Bhynsh."

Juglans regia, Walnut : "Ukhrot." S. Ukhshod. Akhod. "Ukor."

Peperomia saxatilis: "Methia-banda."

Osyris Nepalensis: "Bukurdhura."

Elaeagnus gheewaen: "Gheewaen." Edible Oleaster.

Daphne cannabina: "Set-burwa." Paper shrub.

Cinnamomum albiflorum: "Tujpat." "Kirkiria."

Amaranthus spinosus.

Alternanthera nodiflora.

Celosia argentea: "Siralee." "Ghogia."

Aerua lanata: "Sajee."

Pupalia sequax: "Jhut-kooree."

Achyranthes aspera. The Oude Rajpoots consider this plant to be a safeguard against scorpions, which it is believed to paralyze. This corroborates Sir W. Jones, (As. Res. IV. 300.) "The vulgar name, however, of the Ichneumon Plant is Rasun, (Rasna?) * * * it is asserted by some that the Rasun is no other than the rough Indian Achyranthes." Dr. Royle states that the leaves of *Salvadora* (*Peleo*, *Jal*,) are sold in the bazars as Ra-suna; this may signify "Mustard Senna;" the leaves and fruit having the pungency of mustard or cress: a circumstance which led Captains Irby and Mangles as long ago as 1817 to identify the *Salvadora* with the Mustard Tree of the N. Testament. But Dr. Falconer has since ascertained Ra-suna to be the leaves of *Berthelotia lanceolata*, which is indeed called Resun at Ferozpoor: apparently the S. Rechuna, from rechun, cathartic.

Chenopodium album: "Bhutooa."

Ambrina Botrys.

Beta bengalensis : "Palang." }
Phytolacca acinosa : "Jirrug." } Cultivated.

Rumex nepalense : Dock. "Huloonia."

Rumex hastatum : Sorrel. "Ulmorn."*

Fagopyrum vulgare : "Ogul." Buckwheat. Cultivated as a vegetable. The species, *F. emarginatum*, grown in the Upper Himalaya, is called "Phapitur;" a nomenclature reversed by Dr. Royle.

Fagopyrum corymbosum : "Bun Ogul."

Polygonum convolvulus, *repens*, *recumbens*, *lanigerum*, *seabrinerium*, *herniaroides*, *glabrum*.

Mirabilis jalapa. Completely naturalized, and of many varied colors. The blossoms open regularly about 11. m. The name "Gool-bansa," or Flowering Justicia, may be the origin of Gool-Abbas.

Boerhaavia procumbens.

Cocculus laurifolius : "Keekra." "Tilbura," "Tilpara."

Cocculus Roxburghianus : "Gujera." "Gurjial."

Cissampelos convolvulacea : "Parce."

Clypea. N. S. Edgeworth.

Stauntonia latifolia : "Gophla." Edible.

Andromeda viscidiflora : "Uyar." } Nearly exterminated
Rhododendron arboreum : "Booroosh." } about Almorah.

Primula speciosa : "Biskhopra." "Jul-kootia." Abundant by streams from 3500 to 5500 feet, and considered poisonous to cattle.

Anagallis cerulea : "Junk-mura." "Jyngunee." Triturated, it is employed to poison fish, and to expel leeches from the nostrils.

Lysimachia alterrifolia, *pyramidalis*, *lobelioides*.

Androsace rotundifolia and *incisa*.

Samolus valerandi : On the Sowal.

Myrsine bifaria.

* Almorah has its name from the prevalence of this plant, Musooree from *Coraria nepalensis*; and Simlah perhaps from the Semul, there being a Simlah at Calcutta also. In this, the people only follow the example of their fathers, who were so addicted to botanical nomenclature, that six out of their seven Dweeps are named from plants, viz. Tumboo, *Eugenia jambolana*. Koosh : *Poa cynosuroides*. Pluksh *Ficus infectoria* and *religiosa*. Salmulee (*Senul*) *Bombax malabarica*. Sak, *Tectona grandis*. Poosh-kur. *Nelumbium speciosum*. All tropical, or nearly so.

Symplocos paniculata : "Lodh." The tree which grows from 7000—9000 feet seems to be a distinct species.

Ilex excelsa.

Cuscuta grandiflora : "Akash-luggoolee."

Porana ramemosa.

Evolvulus sericea.

Aniseia barlerioides : Banks of the Kosilla : 4000 feet.

Ipomaea cærulea, *muricata*, *pes-tigridis*, *sphaerocephala*.

Pharbitis purpurea : naturalized.

Lobelia trialata.

Campanula ramulosa ? *pallida*, and *svylvatica* (*integerima*, Don.)

The last, which abounds from 4000—8000 feet, much resembles *C. lancifolia* in Wallich's Ed. of Roxburgh, F. T.

Cephalostigma hirsuta.

Hamiltonia (Leptodermis) lanceolata : "Pudera." Passim.

Hamiltonia azurea : "Jogia-pudera." Very sweet when let alone: extremely offensive, when bruised.

Gardenia tetrasperma : "Burra-gurrec."

Hymenopogon parasitica : "Bhynsia-pudera." Oaks, 7000—8000 feet. Binsur.

Argostemma sarmentosa.

Kohautia coccinea and *gracilis*.

Hedyotis Burmanniana and *Lindleyana*.

Spermacoce articularis and *stricta* : the last to 6000 feet.

Knoxia mollis.

Rubia cordifolia : "Mujethee." Madder.

Galium latifolium, (*elegans*, Wall.) and *asperifolium* : "Koorce." G. *aparine* in cultivated land.

Lonicera diversifolia : "Bet-kookree."

Vernonia anthelmintica : "Kaljeera." *Cinerea* : and var. *scabrida*.

Adenostemma latifolium.

Eupatorium longicaule : at 6000 feet, Binsur road.

Aster bellidifolia : "Murch-mool."

Callistephus sinensis : China aster. "Nypala :" said to be originally from Nepal.

Leptocoma racemosa : (Siyahec Devee.)

Bellis perennis. Introduced from Ireland and flowered for the first time, August 14, 1847 : continuing to bloom most of the year.

- Myriactis oleosa.*
Solidago nepaleensis.
Amphirapis cuspidata.
Sphaeranthus mollis.
Dicrocephalus gracilis.
Cyathocline lyrata.
Conzya pinnaefida and *veronicaefolia*.
Bunaea alata : "Umdok,"—and *lacera*.
Inula cappa : "Tamagurree."
Vicia indica.
Eclipta prostrata and *erecta*.
Siegesbeckia orientalis . . . Geburee.
Xanthium indicum : to 5600 feet
Zinnia elegans and *multitubosa* : naturalized.
Wedelia ——— : Eagerly eaten by rabbits : "Koorshinia."
Calliopsis tinctoria : naturalized.
Bidens Wallichiana, *bipinnata*, and *repens* (*trifida*) : "Kutaree."
Artemisia indica : Wormwood. "Patee." Offered to the gods.
Artemisia scoparia (*elegans*, Roxb.) "Jhaoo."
Artemisia parviflora.
Guaphalium hypoleucum ? and *ramigenum*.
Filago indica.
Antennaria contorta and *semidecurrens* : "Jhoola." "Bokula."
"Goofa." The tomentum is in general use for tinder and moxa.
Carpesium trachelifolium : 7300 feet, Binsur Temples.
Emilia sonchifolia.
Senecio pallens : "Rut-putya."
Echinops nivea : Globe-thistle.
Aplotaxis carthamooides.
Tricholepis reticulata.
Echenais? *ferox*, N. S. Edgeworth.
Echenais arachnoidea : N. S. Edgeworth. "Thukyla." White Thistle : root edible.
Serratula pallida ; lowest limit, Almorah.
Ouoseris lanuginosa : "Kupassee." The tomentum, "Kuphee."
Leucomeris spectabilis : "Punwa." 6000 feet on Kaleemutia.
Berniera nepalensis (*Chaptalia maxima*, Don.) 7000 to 7500 feet on Binsur,

- Leontodon taraxacum* and *criopos*.
Tragopogon elegans.
Sonchus arvensis and *Royleanus* : "Oophut Kunyla." "Nulsha."
The last is eaten.
Prenanthes (Lactuca) procumbens, Roxb. *Microrhynchus patens*.
" *Tungulee-gobhee*." A favourite food of rabbits and chukors.
Lactuca arvensis.
Barkhausia aspera; N. S. Edgeworth. Cultivated grounds from
5000 to 7000 ft.
Youngia runcinata,
Plantago erosa: (Don.) "Lohooria :" and *lanceolata*.
Scabiosa candolliana: "Nara." Descends to 5000 feet.
Dipsacus? (lilac) "Narou." Root used in washing the hair.
Valeriana Hardwickii: "Shumeo."
Valeriana elata.
Plumbago Zeylanica.
Ehretia serrata: "Poonya."
Heliotropium brevifolium : much resembles a sp. common at Lodi-
hana.
Trichodesma indica.
Cynoglossum canescens and *glochidiatum* : "Koorce."
Plectranthus cordifolius, *rugosus*, *Gerardianus*, *Coetsa*, *rubicundus*
(Don.), and *pilosus*.
Coleus barbatus : "Feewacc." Passim.
Pogostemon plectranthoides : "Roodla," "Roodra." "Kala-
bashing."
Dysophylla cruciata : swamps.
Elsholtzia pilosa and *crenata*.
Elsholtzia polystachya, (flava?) : "Bhungria." Descends to 5700
feet.
Colebrookia oppositifolia : "Doolshut." Ascends to 5500 feet.
Perilla ocimoides : "Bhungera." Cultivated : but apparently wild
in the Bhabar.
Mentha viridis : "Poodeena." Quite naturalized, but popularly said
to be of English introduction.
Salvia lanata : "Gunnia." Sage.
Salvia plebeia. Hawalbagh.

- Origanum normale* : "Bun-toolsee."
- Thymus serpyllifolius* : "Bun-jowain."
- Hedeoma nepalense*.
- Micromeria biflora*.
- Melissa repens* and *umbrosa* : (M. *flava*, at 8000 feet on Biusr.)
- Scutellaria linearis*, *repens*, and *scordensis*.
- Anisomeles ovalia*.
- Lamium amplexicaule*.
- Stachys sericea*.
- Craniotome versicolor*.
- Roylea elegans* : "Tit-na ee" — "Barb-ka-teet," i. e. Hedge bitter.
- Leucas lanata*, *indica*, *cephalotes*
- Tenerrimus quadrifaria*
- Ajuga parviflora* and *bracteosa*.
- Verbena officinalis*.
- Clerodendron serratum*, *odoratum*, *ternifolium*, *fetidum*
- Catalpa incana* : "Duya."
- Vitex negundo* : "Shiwalee."
- Premna barbata*.
- Bignonia suaveolens*. "Padul." Upper limit, 4000 feet.
- Didymocarpus lanuginosus*.
- Strobilanthes attenuata* and *glutinosa* : "Koopoor-nulee."
- Barleria ciliata* : "Surp-jeeba." Seeds employed to cure snake-bites.
- Adhatoda vasica* : "Bashing." Indigenous to 4590 feet: the stems are used for gunpowder charcoal.
- Lepidagathis hyalina* and *cuspidata*.
- Rostellaria procumbens*.
- Diapheroides bupleuroides*.
- Utricularia stellaris*.
- Verbascum Thapsus* : "Ekulbeer."
- Linaria incana* : (L. *bipartita* : naturalized.)
- Antirrhinum orontium* : cornfields.
- Serophularia auriculata* : "Gujjyla."
- Mimulus nepalensis*.
- Mazus surculosus*, and *rugosus*.
- Lindenbergia grandiflora* and *ruderalis*.

Limnophila menthastrum : "Jungulee Sonf." "Loung-mooshk."

Limnophila hypericifolia : (*Cybbantha connata*, Don.)

Herpestis Monnieria : "Jul-neem" of the Plains.

Vandellia pedunculata and *nummularifolia*.

Bonnaya bracteata (and *grandiflora*?)

Buddleia crispa and *Neemda* : "Bhatee." "Dhoula." "Shioontra."⁵

The first is very fragrant.

Veronica anagallis, *agrestis*, *deltoidea*? and *biloba*.

Buchnera hispida : (blue.)

Striga lutea and *cuphrasiooides*.

Gerardia delphinifolia : (yellow.)

Centranthera hispida.

Pedicularis carnosia.

Solanum rubrum : "Chhota-gheewaecn." Ink is made from its juice.

Solanum verbascifolium : "Usheta."

Solanum lycopersicum.

Physalis peruviana.

Nicandra physaloides. } Naturalized.

Datura alba and *ferox* : a var. of the latter? with double yellow flowers is commonly planted by the temples of Muhadeo.

Nicotiana tabaeum : cultivated : 2 varieties. "Tumakoo," "Dhu-makoo."

Petunia phænicaea : naturalized.

Pladera pusilla.

Gentiana marginata and *pedicellata*.

Ophelia angustifolia and *alata* : "Cherayuta." From the S. "Kira-ta-tikta," *the Bitter of the Kiratas*, the Kirrhadæ of the Greeks, still existing as the Kirantis and Limboos about the sources of the Kosee, as we learn from Hodgson, Campbell, and Kirkpatrick : the latter states that they conquered Nepal, and it is probable the Newars are their descendants. The mountain name of the plants is "Teeta-kana," from the S. "Kanda tikta," *Bitter stem*.

O. paniculata, *purpurascens*, *cordata*, abound on all the neighbouring mountains.

Alstonia lucida : "Doodhee."

Nerium odoratum : "Kuniyoor." Banks of Kosilla.

Vinca parviflora.

Ceropegia wallichii, and *gracilis*, (N. S. Edgeworth.)

Marsdenia Roylei : "Moorkeela."

Marsdenia mollis : (undescribed, Edg.)

Cynanchum glaucum and *Dalhousiae*.

Cryptolepis reticulata: up to 4000 feet.

Gongronema — — : N. S. Edgeworth : common climber on the granite rocks, Almorah to the Kosilla.

Pinus longifolia : "Cheer," "Surul," "Suffa;" the first is from the Sanscrit "Ksheerahva," Milky, resinous. It descends to 2500 feet along the Surjoo.

Equisetum : "Guthia." "Poodjoree."

Cureunna angustifolia : "Huldee."

Cureuma kuchoor : "Huldee." Cultivated.

Hedychium coccineum : "Rukto-huldee."

Hedychium spicatum : "Kuchoor-kuehree." The rootstocks are pounded down with tobacco intended for the Hookka.

Hedychium flavum : "Keola." Gardens.

Canna speciosa : "Keewara." Ditto.

Globba secunda? Hawalbagh.

Amomum subulatum? "Ilachee." Gardens.

Cureuligo orthoides : "Petaree." Up to 6100 feet.

Hypoxis minor.

Crinum : "Chundur-Kunwal." "Pindur." "Kummo." A garden sp. not agreeing with any in the Flora Indica.

Pardanthus sinensis : "Kutar-puta." Passim.

Iris nepalensis : "Kutaria." "Neel-Kumul" Gardens, and about temples.

Cyrtopera flava. To 4500 feet.

Satyrium nepalense. Descends to 4000 feet.

Platanthera susannae, *pectinata*, *arcuata*.

Habenaria rostrata.

Gymnadenia? *commelinæfolia*. At 6000 feet on Kaleemuttia.

Phoenix sylvestris (*humilis*) : "Khujoor." "Thakil." To 5000 feet.

Paris polyphylla. Descends to 5000 feet.

Anguillaria indica. To 6000 feet.

Gloriosa superba : "Bish-nangul."

Lilium wallichianum.

Fritillaria Thomsoniana.

Tulipa stellata : "Mijhoula." "Nulkia." Abundant in the cultivated ground : the bulbs are edible and exported to the Plains.

Scilla indica : "Ghesooa." To 6400 feet.

Summit of Kalcemuttin, and near Pugog village, Simla.

Liriöpe spicata : (*Ophiopogon*).

Polygonatum cirrhifolia.

Uvularia Leschenaultiana.

Asparagus adscendens : "Khyrooa."

Yucca gloriosa : naturalized.

Aloe perfoliata : "Gheekwar." Gardens, but rare.

Smilax villandia : "Kookurdhura"

Juncus bufonius : "Sheem," "Chhota Guthia." Passim in swamps, &c.

Commelynna obliqua : "Kanjura." "Kana." Root edible.

Commelynna. Two other undetermined sp.

Cyanotis barbata.

Dithyrocarpus paniculatus (*Tradescantia paniculata*, Roxb., and probably *Anemone hispida*, Don.) "Kundera." To 4500 feet.

Murdannia scapiflora.

Pontederia vaginalis. Ricefields.

Dioscorea versicolor : "Genthee." Deliciously fragrant.

Dioscorea sagittata : "Tyr." "Turoor." Tubers edible, lying from 3 to 6 feet deep in the soil.

Dioscorea pentaphylla : "Tegoona." "Takoolee."

Dioscorea quinata : "Muggia." "Moonia." Tubers white, edible.

Dioscorea deltoidea : "Goon." —Siyahée Devee.

Sauromatum guttatum : "Kala" or "Chilia-bánk."

Arum hastatum.

Arum colocasia, (Roxb.) "Jungulee-gheoeea." "Roolkia." "Gur-papur." Leaves edible.

Arissäma : several sp. "Surp ka goga." "Samp ka bhootta," i. e. Serpent's maize.

Remusatia vivipara : "Banj ka pindaloo." Passim on rocks and oaks from 3000 to 8000 feet.

Acorus calamus. "Buj," "Buch." The dried rhizomes are put amongst seed corn to preserve it from the weevil: they are also worn as an amulet against sorcery: ("goor-buch.")

Potamogeton mucronatum: "Putulia."

Lemna (minor?) "Kall." "Turai."

Azolla, "Pun-tyra." "Turai." Covers the pools, &c., of a deep red all the spring. Believed to fall with the rain.

Saccharum spontaneum: "Jusha," "Jhanshi." The blades of its long rooting surculi, are substituted by the Almorah Brahmans, in various religious ceremonies, for the *koos*, which they teach the people is this saccharum: its proper name, "Kas" is transferred to a beautiful species of *Erianthus*. *Saccharum procerum*, "Ramshur," is planted near sacred wells, but does not appear to flower at Almorah.

Imperata cylindrica. "Shuro."

Arundo karka: "Nultoora." To 5000 feet. Baskets, &c., are made from its culms.

Th. sanolæna agrostis, (*Agrostis maxima*, Roxb.) "Ousa," "Ouns." Up to about 5000 feet.

Andropogon calamus—*aromaticus*: "Boojura," "Palakhuree." Gives the mountains at 5000 to 6000 feet, their rich brown colouring in Nov. Dec. The seeds seem different from those of the Neemaroil-grass: and have neither the same pungent odour or oily feel.

Andropogon penicillatus.

Andropogon cæruleus: "Ghweria," excellent forage.

Andropogon (*Rhaphis*) *microstachys*: "Cheroula." "Chura." "Pulkia."

Andropogon contortus: "Koomuria." Spear-grass.

Rhaphis Royleana: "Salim."

Cymbopogon ———: "Peeria." Aromatic.

Perotis latifolia,

Erianthus: "Kas."

Erianthus: "Nounia" (Butter): "Telia."

Erianthus.

Anthistiria anathera: "Chooneria." "Jyotishmati," roots frequently luminous.

Ischænum corollatum: also called "Nounia."

Coix gigantea: "Loochoocha."

- Paspalum longiflorum* : "Kana." Ricefields.
Panicum frumentaceum and *chamæraphe*.
Panicum miliaceum, apparently wild at Hawalbagh.
Panicum colonum : "Soun." "Jungulce Mandira."
Pennisetum triflorum : "Bemulshia."
Setaria glauca.
Aristida cyanantha : "Binnia." "Kukulsena."
Sporobolus elongatus.
Polypogon fugax : "Geewa." "Gecolia." In streams.
Cynodon dactylon : "Doob."
Digitaria Roylei.
Eleusine indica.
Avena fatua : "Jou-ata." Corn-fields : the straw is given to cattle : but is suspected.
Poa.
Eragrostis.
Briza.
Plagyaelytrum filiforme.
Arundinella miliaris and *hirsuta*.
Bambusa. Grown at Dhamus, 4000 feet, for baskets.
Lolium temulentum. Corn-fields.
Carex indica. Binsur, &c.
Tsolepis trifida.
Scirpus muticus.
- Eriophorum comosum* : "Babila." "Babeo." "Babur." "Byb." The rope made of this, is in general use : the Almorah species, "Pun-babeo" is by the people distinguished from that which yields the "Byb :" but apparently without foundation : they believe that the latter never flowers.
- Cyperus tenuiflorus*.
Cyperus _____ : "Motha." Used for mats.
Mariscus dilutus ? "Pun-motha." "Nagur-motha."
Lipocarpha argentea.
Eriocaulon solyanum. Passim, swamps.
Adiantum capillus-veneris : *rhizophorum*.
Asplenium sinuatum : Walls.

Botrychium _____: "Bish-Kootra."

Woodwardia radicans.

Chilanthes dealbata? Walls.

Pteris ——— : "Koun."

Platyloma ——— · Rocks, 4000 feet.

Lygodium semibipinnatum? "Murora." "Bun-dhuniya."

Lycopodium tenellum : *obtusifolium*? Oaks on Jagesur at 7000 feet : and the beautiful *L. setaceum* on the Ramgunga at 1800. (R. S.)

Lycopodium circinale? Damp soil, 4000 feet.

Agaricus —— Mushroom: "Chheoo," "Chhao"

Lycoperdon. Puffball : " *Phuschia*," " *Houla-toomree*,"

The list of grasses and ferns might be much extended.

The Cercalia and Leguminosæ, &c. cultivated about Almorah, and generally in Kumaon, consist of, for the Rubbee crop, reaped in April and May.

Triticum vulgare : "Jal Gehoon," "Tanga," and "Joosher." The red or bearded varieties : Daood khanee or Duwa the white or awnless : the last sells at from four to six seer per rupee less than the first, and is grown in large quantities about Somesur, &c. "Kunnik" in this Province denotes flour, not the grain.

Hordeum hexastachyum: "Jou." A short-awned variety is called Rena.

Hordeum cæleste: "Qoa-jou."

Pisum arvense : "Kulon." "Grey Pea" : *Ervum lens*, "Mussoor," Grey Lentil; *Cicer arietinum*, "Chuna," Gram, are also grown, the last two sparingly, in the warmer locations and are reaped at this season.

Papaver somniferum: both white and purple. "Posht." Opium is made to a small extent, chiefly in Shor: but in the Gurhwal raja's territories, it is said to be abundantly produced.

Sinapis glauca : (Royle ?) *dichotoma* ? (Roxb.) is much grown either alone or with barley, for its oil: *S. glauca*, (Roxb.) "Dacen," "Dyn," "Rara," or "Rada," though it affords more oil, is much less common, requiring a very rich soil.

In the environs of Almorah, the "Juria" or "Judia" is a favorite

crop, as an oil-seed : it is probably *Sinapis dichotoma*, but much resembles *Brassica rapa*, and the malees all assert that it may be and is converted into the Turnip.

Several species of *sinapis* are also grown as salads, *turkarees*, and condiments, of these :

“Burlai” is *S. ramosa* : “Race” of N. India : *S. rajika*, from *raj*, to shine : very appropriate to the whole genus in flower : or from *raji* a row, a line, in which they succeed much better than in plots.

“Bhotiya-rae :” “Badshahee-lai ;” *S. rugosa*. Introduced by the Gorkhas, and greatly valued. They also brought from Nepal another “Badshahee-lai,” called “Kurm-kulla,” probably *S. brassicata* : but it has disappeared. This species is nearly allied to *S. ramosa*. It has been introduced to the Dehra Dhoon.

“Raee.” “Mukura-raee” (Tarantula mustard) of Hindoostan : the “Surshuf” of the hospitals, where this species is employed : the seeds and the leaves being exceedingly pungent. It is not described in the Flora Indica, but approaches *S. erysimoides* : and is probably *S. —————* near *S. nigra* : *S. sinensis* in Ainslie’s Mat. Med.

“Doowa.” “Chara.” *Eruca sativa* : comes up accidentally with the above : but is not cultivated.

The “Khurbee” or autumnal Harvest, comprises a less valuable but more numerous catalogue, on which depends generally the subsistence of the lower classes.*

Oryza sativa : “Dhan.” The rice is sown about the middle or end of April, either in beds, “Khiaree,” from which it is transplanted ; or

* About the middle of July, (on the 1st of Sawun) is celebrated the greatest of the Khushia festivals, known as the “Huriyala,” a name marking the universal verdure and the appearance of the ear in the corn at this season. This occasion embraces both harvests, small patches of wheat and the other rubree grains being raised purposely ; so that bouquets of all the cerealis and leguminosæ (Mundooa and Bhut excepted) may be presented to the gods. On this day, also, the mountaineers generally deck their own heads with a few blades of corn, exactly as the shamrock and leek are worn in Ireland and Wales, originally, perhaps, for the same reason.

On the 1st day of the Indian Bacchanalia (the Holee) about the middle of March, the Gorkhas of the Kumaon Battalion, proceeding to the East, deposit some coins, &c. at the foot of a wild Pear tree, which is afterwards cut down, and ornamented with innumerable shreds of red cloth, (from which it is called the Cheer,) is carried in procession and planted in front of the lines with boisterous merriment : and is sung and danced round daily till the orgies are over : it is our own May-bush precisely, the pear-tree being no doubt chosen for the same reason of its being then in full blossom.

less frequently, in the fields where it is to remain. These are carefully and laboriously manured and worked up by the treading of cattle : and in May, the task of removing the young plants from the nurseries falls on the women and children, who work cheerfully under a sun which would be fatal to the European. They are also the only reapers and weeders of the province, and are, in truth, little better than slaves. During the wet season, and indeed at all seasons, the crop is kept constantly inundated : and had Collins ever tried the experiment, he would never have written the line " what times 'tis sweet o'er fields of rice to stray." In the upper grounds the people well understand the propriety of the rotation of crops : but where a copious supply of water and a hot sun are conjoined, rice seems to be planted from year to year. The Harvest takes place from the middle of September, to that of October. There are many varieties of this grain ; the best has its name from the Salim district on the Punar river, S. E. of Almorah.

Sorghum vulgare : " Joonulee :" S. Yonul. Little grown.

Panicum frumentaceum ; " Mandira." " Jhoongura." " Sama."

Panicum italicum : " Konee," " Kungnee."

Panicum miliaceum : " Cheena."

Eleusine corocana : " Mundooa." The latest crop to ripen, and most extensively grown, though a bitter and indigestible food. The grain is rudely broad-cast, and afterwards transplanted and regularly distributed during the first heavy showers of June.

Zea mays : " Mukkucee." " Bhootta."

Amaranthus anardana : " Chooa." " Ramdana."

Amaranthus speciosus : The drooping ditto : gardens.

Fagopyrum vulgare : " O gul." Buckwheat.

Perilla ocimoides : " Bhungura."

Sesamum orientale :* " Til." The white variety, " Tilee."

* This plant, (with black seed) wild everywhere in the Kumaon. Bhabur is largely cultivated as high up as Almorah. Dr. H. H. Wilson, in an interesting paper in a recent number of the K. A. Society's Journal, comparing the Indian festivals with those of Europe, remarks the custom of the Greeks on occasion of marriages to mix Sesamum in the sweetmeats distributed to the friends and guests of the parties. The same practice is universal amongst the people of Kumaon ; " Luddoo" being the vehicle used. From the Sanscrit ' til,' to be unctuous, probably comes the Latin *Tilia*; our English " Lime" may allude to the same honey-like exudation from the leaves.

Solanum melongena : "Baingun." "Bhutta." A very fine variety of a rich purple color which gives the adjective "baingunee."

Saccharum officinarum : "Rikhoo" (from Sans. riksh, to cut?) "Gunna." The large variety is called "Poona," the small, "Kanthee Rikhoo." Chiefly from the districts about Dwarahath and Gungolee-hath.

Colocasia Himalensis : Royle. "Ghweca" of the Plains : two varieties, the white, "Pindaloo," the red, "Guderee;" the leaf "Papur," and the unrolled leaf "Guba" are also edible.

Capsicum frutescens : "Koorsanee."

Solanum tuberosum : "Aloo." The Potato, from English tubers, introduced in 1843, by Major Welchman, yields excellent produce at Almorah and Lohooghat ; up to the end of 1847, no vestige of the *rot* has shown itself : the hypothesis, therefore, that the Plant is worn out by continued propagation from the tubers cannot be sustained.

Cucurbitaceæ : Almorah is supplied with most of the kinds which grow in northern Hindooosthan : *Cucumis sativus*, "Kakura," very large : *Charantia muricata*, "Kurela :" *Luffa acutangula*, "Torai :" *Luffa pentandra*, "Gheea Torai :" *Trichosanthes anguina*, "Chichinda :" *Cucurbita maxima*, "Gudooa," Kudoo :" *Lagenaria vulgaris*, "Louka," "Loukee :" a very fine variety introduced in 1846, from Jubulpoor, by the men of the first Co. 7th Bn. Artillery. The small variety is called "Toomree." *Benincasa cerifera* (*Cucurbita pepo*), "Bhoonja," "Petha," and "Kumhra."

Zingiber officinalis : "Ada :" grown in all the hot vallies. *Curcuma longa* (or "Kuchoor ?" "Huldee :") ditto.

Dioscorea : "Genthee," and "Ghunjdeer," or "Ghujeera :" cultivated : species unknown : the pundits affirm the Ghujeera and *D. quinata* or *pentaphylla* to be the "Kakolee" and "Ksheer-kakolika" of their old books. Generally amongst the cerealia, will be found some of the undermentioned leguminous plants.

Dolichos uniflorus : "Guhut :" the "Koolut" of the N. W.

Dolichos catjang : "Rensh," "Ree-ensh," or Rysh : 3 varieties, of which one is called "Sonta."

Soja hispida : "Bhut." Common about Almorah : "Khujooa" of Rohilkund.

Lablab cultratum : "Sheemee :" gardens.

Phaseolus radiatus : "Oord."

Phaseolus mungo : "Moong," (rare.)

Phaseolus torosus : "Gooroush," or "Gooroosh." One var. with red, another with cream-coloured seeds : these are grown at a higher level (6,000 feet) than the other kinds of pulse : chiefly in Kalee Kumaon but also cultivated about Almorah.

Almorah cannot boast of much or good fruit : the grapes are only fit for verjuice ; the apples and pears indifferent : the cherries only fit for Kir chenwasser ; the apricots for jam and pigs : there are two species of plum, palatable, but unwholesome ; one, a dark blue damson, "Bhotiya Budam," ripens in July ; the other, which is called "Ludakh," is orange-red, much larger and ripens in June. Tolerable plantains are produced in the warmer vallies, and the oranges, the best from the low vallies to the eastward, are excellent. The lemons produced about Almorah in the cold season, and allowed to mature in straw, are not to be excelled in size and flavor : citrons "Beejoura," and "Kurunphul," are also grown : the shaddock and lokat ripen at Hawulbagh ; the sweet lime, "Umritphul," towards the Surioo. The wild fruits "Kae-phul" (*Myrica sapida*), "Bumoura" (*Benthamia fragifera*), "Heesaloo" (*Rubus rotundifolius*), "Gheewaen" (*Elaeagnus gheewaen*), come under Dr. Lindley's category, "Eatable, but not worth eating." In truth Almorah is not the spot for an epicure to fix on ; the feast of reason is the only one indigenous to the European ; and while his eye rests with delight on terrace rising above terrace for fifteen hundred feet following the N. dip of the strata, all green and glowing with the precious fruits of the earth enumerated above, and each, in autumn, divided by its white belt of "Jhoola," (*Anteunaria semidecurrens*), to him the welcome symbol of the coming winter, he must acknowledge that if elsewhere the proverb comes true that God sends us food and the devil cooks, at Almorah the last are better than the first, and that he must needs remain a gastronomic Manichaean. Such being the case, we may as well re-descend to the Plains and continue our lowland route eastward from Bumouree.

8th March, 1847.—From Huldwanee to Jam Goth, 6 or 7 miles ; path indifferent, and the jungle generally of small Khyr and Sissoo, with some Kunjoo, Hulloo, and latterly a few large Sal, now coming into flower. Many of the trees are leafless, while those on the heavily wooded mountains present a mass of verdure.

Close to Huldwanee cross the stony bed of the Goula, about half a mile across : almost all its waters are diverted above this into the numerous kools which irrigate the forest cultivation of Kounrpoor and Nougaon Goths, at about the 4th mile on the route. They comprise a large tract of luxuriant wheat and mustard cultivation, the former now in the green ear, the latter ripe. Amongst the corn, I observed growing in abundance the *Lathyrus aphaca* "Ghora-Kulon," the *Lathyrus angulatus*, "Ningala-Koshee," (i. e. Hill-Bamboo Legume,) *Ervum hirsutum*, "Kooree," and *Melilotus leucantha*, "Gureela." The hemp plant is also abundant, but apparently less luxuriant than in the Hills. About 2 miles beyond Nougaon is Jam, another Goth, where one of the sheds afforded a welcome refuge from the exceedingly hot sun ; the temperature too, is becoming so high, that the people are already sending their wives and children back to the mountains : these are about a mile and a half distant : the Sookhee nudee issues from them, and flows east of Jam, separating the Chhukhata Bhabur from that of Chou-bhynsia.

None of the people can give any etymology for this word Bhabur : or Bhawur : some have erroneously derived it from the Babur grass (*Eriophorum*) which does not grow here, but in the Hills ; and is also differently spelt, as applied by the people of Kumaon, it denotes the high and dry tract of *forest* land at the base of the mountains ; *Turrai*, a word which is scarcely known, is properly the tract of swamp and grass lower down, and may either come from the Persian *turee*, moisture, water, in opposition to dry land (Shakespeare) or from the Hindoo *tule*, low, below ; by the Gorkhas the whole space is often called Mudh-des, "middle country," between the hills and plains, or rather perhaps, they preserve the favorite Hindoo notion that India is the central country of the world. It is strange enough that Humboldt (Cosmos, note 7,) should confound Madja-desa with the Chinese Mo-kie-thi, which is manifestly Magadha, or South Behar.

Jam is but a small Goth, and the people are in great fear of the tigers : a man was carried off from a field a week ago : and they assert that a few days since two of these "police of nature" fought, till one of them was left dead on the spot, nor far from this.

9th March.—To Chorguliya, about 9 miles, called 7 coss : the path stony and bad, generally close under the mountains, through dense for-

est of Sal, *Semecarpus*, *Hymenodictyon*, &c. Near Jam haccery tracks come up perpendicularly to the Hills, for drawing the Sal timber. But most of the large trees near the route are gone. At about 5 miles pass a Goth called Surria Panee, from its lethæan stream of bad water, and two miles farther, where the Dewa debouches from the mountains, the richly cultivated and irrigated settlement of Lukhmun Mundee : here the path leaves the base of the mountains, and two miles on, reaches Chorguliya, a large and ancient clearing, well sprinkled with huts and Goths, but without a tree to shade the luckless passenger, though millions are in sight all round. The place probably has its name from Chor-gurha, a pitfall, or Chorguliya, "defile of the thieves." The Dewa flows about a mile to the east, in several broad stony channels, covered as usual, with Sesoo, now coming into leaf and flower ; at present only one of these channels carries a small runnel of water. This stream rises amongst the lofty mountains of the Dhyanee Rao Pergunna, apparently from a huge bare range called Ncta : it is known in the hills under the name *Nudour*, in the Turace as the Dewa, and under the third name of Gurra, passes Peerbheet and Shahjuhanpoor, and finally joins the Ramgunga.

From Chorguliya there are two routes to Burm Deo ; one makes a great circuit to the south, through the grass jungle to Nanukmuth, 12 miles, Suniya, 2, and Burm Deo 11. Nanukmutha is reported to have been founded by the prophet of the Sikhs, with a promise that the rule of his disciples should one day include it : there is a temple there, where the offering consists of the Soapnut, which, in its common form might imply a sarcasm on the personal purity of the divinity ; but in this case the fruit, called Goolia-reetha, is said to be sweet and edible, from a spot known as Raj ka Shera in upper Dhyanee Rao ; where if the chronicles lie not, grows a tree of which one side produces sweet, and the other, the common nut : the prodigy was effected by a hungry fakeer. Nanukmutha is 773 feet above Calcutta. Suniya, a mart for ratans, 829 feet, is the same as the Bilehree Mundee of the maps, and I believe with Khetul Sanda. Between this line and the mountains, at from 8 to 16 miles distance, there is in the Choubhynsia district, an impassible belt of cane-brake, the favorite lair of the Cheeta (*Python tigris*) commonly called the Boa ; they also penetrate into the great vallies of the Surjoo, and are held in much terror by the people : the name is from "chitr," spotted.

The second route, which I followed, contrary to certain visionary objections of Choundhree Burgulia the Teekadar of Chorguliya, keeps to the forest, close under the mountains : it cannot be traversed after March, as the Goths, which furnish the necessary guides, are then deserted ; and even in March it is desirable to travel by night and by moonlight : the heat in the day time is very great, and such is the intricacy of the forest, and the narrowness of the path, that one cannot well get on beyond a walk. There is a direct path under the mountains from Jam viâ Dhaktuliya to Joulasal. Near Jam occurs a very beautiful and exceedingly bushy Acacia called *Bhes* either dumosa or latronum ; and on the Dewa we first meet a large scandent Dalbergia probably *D. volubilis* ; it is called *Bhuteea*, and becomes more and more common as we advance to the East. In swampy places the *Randia uliginosa*, a handsome shrub, abounds ; it is called "Pindara," "Pindaloo," and yields an edible fruit when cooked.

March 10th.—To Joulasal, called 7 coss, about 10 miles, East : crossing the Dewa, passed a large Geth called Kulluga, 964 feet above Calcutta : here the path again abuts on the mountains, and skirts them to Hathgar, another large Goth about half way to Joulasal, behind which the mountains recede in a beautiful bay. These are mere stations of shepherds and wood-cutters ; there is not a vestige of cultivation between Chorguliya and the vicinity of Burm Deo. The second half of the route is through still denser forest than the first, composed of Sal, Dhak, Hulloo, Saj, Jamun, Rai-jamun, Amla, Bhuliou, Sahujna, Koombh, Amultas, Rolee, *Hymenodycction*, *Callicarpa lanata*, ("Ghi-wala," "Dera,") *Casearia cheela*, (*cheela*, *cheelara*,) *Hibiscus lampas* : and in several places *Symplocos racemosa*. Near Joulasal, occur *Ficus nitida*, *Trewia nudiflora*, "Toomree," and a tall species of *Globba*, "Soura," "Sara :" growing in swamps. The whole of this tract affords large supplies of timber, bamboos, and grass, which is hereabouts exceedingly high and thick. At the Goths the Babur grass, brought from the hills, is stacked extensively for the dealers from the Plains : the people are also collecting the capsales of the Rolee (*Rottlera*) for the red dye they are covered with. This forest stands on a high level, and is intersected by low belts of prairie : contrary to its usual character, the water reaches to within 5 or 6 feet of the surface, and in some places still less. Old *obees* or elephant pits are met, with scattered all over Choubhynsia ; and about half way between Hathgar and Jou-

lasal we came on the fresh ones : it was quite light at the ~~time~~ and the straw, grass, &c., with which they are covered enabled us to avoid them, though placed right in the path, or so closely on each hand as to leave a very narrow ridge between. The owners are Europeans, and have as yet taken but one young elephant this season ; but the chances improve when the herdsmen quit the forest. The obees are now nearly full of water : they are covered with branches and grass, so thinly towards the centre that a dog belonging to one of my people fell in when crossing.

Joulasal consists merely of a clearing spacious enough for the huts of a confederation of some 20 villages from the mountain districts of Dhyanee Rao towards De Dhoora : about a mile back the mountains form another beautiful bay like amphitheatre leading into the Doorga Peepul Dhoon, 2100 feet above Ca cutta, and 12 miles from Joulasal. There is a route hence to Ciumpawut via Birgool, and the Sidh ka Dhoora, south of Furka : and another via Koolegaon on the Ludeea, 10 miles on, to Deo Dhoora. The Doorga Peepul Dhoon possesses quantities of Toon timber, which is uncommon in the rest of the Bhabur : it is cultivated with rice, and amongst its morasses rises a considerable branch of the Dewa, which grows by Joulasal on the west. Nanukmutha is called 6 coss south of this.

In the afternoon moved on to Doogola, $1\frac{1}{2}$ or 2 miles by the path, and thinking to effect this without a guide, we lost our way in the dense Sal forest, and wandered twice that distance. Doogola is a small goth at the foot of the mountains on the high eastern bank of a stream which here leaves them, and flows south. There is a route hence to Suniya by Gungapoor, 2 coss : Deea, 2 coss : Bireea-mujhoula, 1 coss : Kheree nikal, 2 coss : Khetul sanda, 1 coss : Nougaon, $\frac{1}{2}$ coss : Suniya, 1 coss. Suniya is held by the Tharoos, a race who occupy the exterior Turaee, and are said to extend far down to the S. E. The Dewa separates them from the Boksars, a kindred race to the N. W. These people inhabit this "Belt of death" with impunity by observing two precautions ; one is never to be out after sunset during the malarious season ; the other is to raise their houses on piles, after the manner of the Indo-chinese nations. It seems extremely probable that with this proviso and small grass bungalows and sheds raised 12 or 15 feet about the soil, Europeans and natives of India might pass the Turaee or the

swamps of Guinea, with perfect safety at the worst season. From this custom of the Tharoos, and a few strange words, as "Koron" for the Sal tree, I supposed these people might be of the Mongolean species, but they assert themselves to be Rajpoots from Hustinapoor, who fled in battle, and hence the nickname Tharoos "Quakers" from *thurthura-na*, to tremble. A Mugur or Goorung Gorkhalee will equally assert his Rajpoot origin; a descent which is at once disproved by his Tartarian face.

Near Doogola first occurred the "Beejesar" a species of *Pterocarpus*, probably *marsupium*; like several instances already alluded to, it becomes more abundant as we advance eastward: the wood is in much requisition for making *dholuks*, &c., the wood-cutters affirm that it does not grow to the westward. It is No. 77 of Dr. Royle's catalogue, *Journal*, Oct. 1832, and the name perhaps comes from *veej*, marrow, *kshur*, to ooze, or *sar* essence, in allusion to the copious resin which exudes from the bark on wounding it.

(*To be concluded in the next No.*)

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MAY, 1848.

The usual monthly meeting was held at the Town Hall,* on Wednesday, the 3rd May.

J. W. COLVILE, Esq., President, in the Chair.

The proceedings of last meeting were read.

The accounts and vouchers for April were submitted.

The following gentlemen who had been duly proposed and seconded at the April meeting, were ballotted for and elected members:

Dr Adam Bell, Surgeon to the Gov. Genl.

James Corcoran, Esq., Urdu Translator, Sudder Dewance Adawlut.

Andrew Hay, Esq.

Lieut. H. C. James, 32d Regt. N. I.

Captain Champneys, Deputy Auditor Genl.

Colonel Hearsey, 10th Lt. Cavalry.

Read notes from R. O'Dowda, Esq. and J. Ward, Esq. withdrawing from the Society.

John Strathey, Esq. C. S. was named for ballot as an ordinary member; proposed by Dr. O'Shaughnessy, seconded by Mr. Elliot.

George Massey, Esq. proposed by Mr. W. P. Grant, seconded by Mr. Colvile.

Lieut. Albert G. Austen, B. A. proposed by Dr. Falconer, seconded by H. Walker, Esq.

Wm. Taylor, Esq. C. S. proposed by the President, seconded by Mr. Bushby.

Mr. H. Hamilton, Resident at Indore, under explanation of his name having ceased accidentally to be found on the list of members, signified his desire to rejoin from the 1st January, 1847.

* The Society's house being under repair.

Mr. G. Blundell, C. S. also expressed his desire to rejoin the Society. The following letters and communications were submitted.

From H. M. Elliot, Esq. Secretary to Government, Foreign Department, forwarding Reports by Lieut.-Col. Wilcox on the Observatory of Lucknow.

From the same, enclosing Lieut. Dalton's account of his visit to Dewangari, Upper Assam.

From J. H. Batten, Esq. Senior Assist. Commissioner, Kumaon, forwarding the first part of Lieut. Strachey's tour to the lake districts of Manasarowar, in Thibet.

From Capt. Thuillier forwarding Meteorological Register for April, kept at the Surveyor General's Office.

From John R. Broadhead, Esq. United States Legation, London, presenting in the name of the Legislature of New York, 3 Vols of the "Natural History of New York," in continuation of the preceding volumes of the same work formerly presented.

The respectful thanks of the Society were unanimously voted to the Legislature of New York, and directions given to request their acceptance for the State Library of a complete set of the Society's publications.

From the most Rev. the Archbishop of Edessa and Vicar Apostolic of Bengal, transmitting extract of a rescript from His Eminence the Cardinal Prefect, signifying the pleasure with which His Holiness Pius the IX. has consented to accept the works presented by Mr. Hodgson and by this Society.

Resolved, that the thanks of the Society be conveyed to the most Rev. Dr. Carew, and copy of the rescript of the Cardinal Prefect forwarded to Mr. Hodgson.

From H. M. Elliot, Esq. inviting the attention of the Society to an elaborate essay by Colonel Wilford on the ancient Geography of India which exists in MS. in the Society's Library.

To the Secretary Asiatic Society.

SIR.—I beg leave to bring to the notice of the Asiatic Society that there exists in their Library an elaborate essay by Colonel Wilford, on the "Ancient Geography of India," which, as far as I can ascertain, has never yet been published. An essay of his, with the same title, was printed in the XIV. Vol.

of the Asiatic Researches, but it is in no other respect identical with the one I now bring to notice. Even where the names of places mentioned are the same, the manner of treating them is different, and the arrangement of the two essays does not all correspond. It is certainly not an *early* work of the learned author, for the IXth Volume of the Asiatic Researches is quoted in it; so that, although it abounds with the fanciful illustrations, conjectural etymologies, and forced constructions for which he is celebrated, we may be sure that his notorious Pundit had no concern in it.

I am not aware whether the work is known or not to Professor Wilson. Many of Wilford's Sanscrit manuscripts on Geography were lost or dispersed at his death, but a few leaves which were purchased for the Calcutta Sanscrit College were translated by the Professor, and published by him in the Oriental Quarterly Magazine for December, 1821. (See Vishnu Purána, note p. 179.) It is possible that in this translation some allusion may be made to the work I now bring forward, and the translator may have expressed an opinion of its merits. Unfortunately that Magazine is nowhere procurable in the city of its birth, and I cannot ascertain this point.

As however the work is no doubt known to Professor Wilson, who had for so many years the command of our Library, it might be as well to ask his opinion of it. If it has escaped his observation, I can only add that I think it worthy of publication in our Journal, in which it would occupy about 120 pages; for even the extravagances of such an author as Wilford, are worthy of record, and his writings are still highly valued for the occasional glimpses of knowledge which they impart, even by those who are most competent to detect and expose their *errors*.

I have the honor to be, Sir,
Your most obedient servant,
H. M. ELLIOT.

April 28th, 1848.

Mr. Laidlay stated that Capt. A. Cunningham had undertaken to edit and publish the MS. referred to.

From H. M. Elliot, Esq. forwarding a paper by Dr. Aloys Sprenger, entitled Notice of some copies of the Arabic work *Rasay el Akhwan al casâ*. Referred to Oriental Section.

From the Rev. Mr. Hæberlin of Dacca, stating that the MS. of the Pundit Jawahir Lal had never been in his possession—also regarding the Sanscrit dramas referred to by Capt. Cunningham. Referred to the "Oriental Section."

From Capt. Alex. Cunningham regarding his discovery of certain Sanscrit dramas—in reply to Babu Ramgopal Ghose,—also referred to Oriental Section.

From Mr. Mansel, Calcutta, stating that the Taj model has been repaired and recommending a massive Table to be provided for it. (Ordered accordingly).

From Messrs. Allen and Co. forwarding bill of lading of a case of books presented to the Society by Mr. Konig of Bonn.

From Johannes Avdall, Esq., presenting a copy of the "Grammaire Polyglotte," a grammar of the Armenian, French Russian, Arabic, Persian, Turkish and Tatar languages, per Le P. Minas Medici, printed in 1844 at the Armenian College, Venice. The thanks of the Society were voted to Mr. Avdall, and personally expressed by the President in presence of the meeting.

From Dr. Roer, forwarding the 3rd Fasciculus of the *Bibliotheca India*, containing the continuation of the first two lectures of the Sanhitá of the Rig Veda.

From Mr. Vos, Architect, submitting estimate for a skylight and for enclosing the south veranda of the Society's house, as an additional apartment for the museum.

The Council were authorized to take the estimate into consideration and proceed with the suggested alterations as they might think fit.

From J. W. Laidlay, Esq., forwarding a note, with Electrotypes impressions in copper of the gold coins presented by Mr. Cunliffe.

The eight gold coins submitted to the inspection of the Society by Mr. D. Cunliffe, are stated by that gentleman to have been found at a village named Kussaraya, in the south-western part of the Monghir district. They belong to what has been termed the Indo-Scythic series.

No. 1.—The analogues of this coin have been figured by Wilson, plate XIV. figs. 12 and 13, with which the present specimen agrees in rudeness of execution and in its general appearance. The name of the prince is Baraoro, or Varaoro, according to Wilson, but is unfortunately not more distinctly legible on this coin than on those which he figures.

Obverse: the prince holding in his left hand a trident, and depositing an offering with his right upon an altar. Legend, POO NONO POO (B O) ONO KOPONO.

Reverse.—A figure of Shiva and the word OKPO.

No. 2.—A coin nearly identical with this is figured by Wilson, plate XIV.

fig. 14. The execution, though barbarous, is superior to the foregoing, so much so as to render it doubtful whether it should be attributed to the same prince.

Obverse.—PAO NANO PAO * * OANO KOPANO.

Reverse.—OKPO.

No. 3.—Apparently unpublished.

Obverse.—Bust of the prince, with legend only partially legible—NO KOPANO.

Reverse.—Standing figure with crescent-shaped wings; legend MAO.

No. 4.—A very rude coin of similar type to No. 1, but legend illegible, except on the reverse OKPO.

Nos. 5 and 6.—Coins of the same prince. *Obverse.*—Bust of the monarch. Legend PAO NANO PAO OGIPKO KO PANO. *Reverse.*—Figure in a long robe holding a cornucopia. Legend APΔOXPO.

No. 7.—Of the same prince apparently, having the same inscription on the obverse as the foregoing, but instead of a female figure with a cornucopia on the reverse, there is a soldier with a spear in his left hand and what seems a parasol in his right.

No. 8.—Analogue of this coin published by Wilson, pl. XIV. figs. 19, 20, 21, 22.

Mr. Cunliffe states that these coins form a portion of 84 found in the bed of the river; and that as the claimants are unable to prove their right to them, the whole will most probably revert to Government, from whom he suggests they might be obtained by the Society upon application, for the museum. If to be had on such easy terms I need not say that their acquisition would be most desirable; but lest it be otherwise, I have made electro-type facsimiles of them for deposit in the museum; and take the present occasion to observe that if numismatologists would furnish us with accurate impressions of such novelties as they may discover, we should soon be able to get up a cabinet of facsimiles scarcely inferior in authenticity and historical value to the originals.

Section of Natural History.

Council of the Asiatic Society, 3rd May, 1848.

The Council of the Asiatic Society submit a reply from Mr. Blyth to the Report of the Section of Natural History on the reference made to the Section regarding Mr. Blyth's application for an increase of salary and a retiring pension.

The Council recommend that Mr. Blyth's reply be read to the May meeting, and referred to the Section of Natural History for their consideration ; further, that the subject be again brought up and finally disposed of at the next meeting.

W. B. O'SHAUGHNESSY,
Secretary Asiatic Society.

Mr. Blyth's reply, which was of great length, was read by the senior Secretary.

The proposition of the Council having been put to the vote, the following amendment was proposed by Mr. Newmarch and seconded by—

That the report of the Section of Natural History with Mr. Blyth's reply be referred for consideration to the next meeting of the Society, and that in the meantime the Section be requested to communicate with Mr. Blyth, in order that statements of facts may be laid before the meeting, to the correctness of which both assent, and nothing be left to the meeting but to decide upon the merit of Mr. Blyth's services.

After considerable discussion the amendment was put to the vote and lost, and the proposition of the Council adopted by a majority of 11 to 4.

The Librarian submitted his usual report as follows :

LIBRARY.

The following books have been received since the last meeting.

Presented.

**The Journal of the Indian Archipelago and Eastern Asia, Vol. II. Nos. II.
III.—BY THE EDITOR.**

A Chrestomathy of the Afghan Language.—**BY THE AUTHOR.**

Twelfth Report of the Inspectors of Prisons presented to both Houses of Parliament by command of Her Majesty.—**FORWARDED BY THE SOCIETY'S LONDON AGENTS.**

The Rocks of Pulo Ubin, by J. R. Logan.—**BY THE AUTHOR.**

Nityadharmañurājanjicā, Nos 56, 57.—**BY THE EDITOR.**

Tatwabodhinī Patricā, No. 56.—**BY THE TATWABODHINI SABHA.**

Draft Report on the Principles of Punishment.—**BY M. HILL, Esq.**

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of March, 1848.—**BY THE DEPUTY SURVEYOR GENERAL.**

Natural History of New York, part 2nd, Vols. I. II. and part 5th.—**BY THE GOVERNOR AND SECRETARY OF THE STATE OF NEW YORK.**

On the coins of the Patan Sultans of India. By Ed. Thomas Esq., B. C. S.
BY THE AUTHOR.

Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen, XXI. eerste Decl.—BY THE EDITOR.

Journal of the Royal Asiatic Society, Vol. X. part III.—BY THE SOCIETY.

The Oriental Christian Spectator, Vol. IX. Nos. 3, 4.—BY THE EDITOR.

Journal of the Bombay Branch Royal Asiatic Society, No. 11.—BY THE SOCIETY.

The Oriental Laptist, No. 17.—BY THE EDITOR.

Upadeshaka, No 16.—BY THE EDITOR.

Exchanged.

The Athenæum, No. 1059.

Purchased.

Calcutta Review, No. 17.

Certified to be a true Report,

JAMES WM. COLVILLE, President

J. W. LAIDLAW, Secretary.

Days of the Month.		Maximum Pressure observed at 9h 30m.				Minimum Pressure observed at 4 p. m.				Rain Gauges.		Moon's Phases.		
Barometer re-duced to 32° ^ø	Barometer re-dueed to 32° ^ø	Temperature.	Wind.	Aspect of the Sky.	Barometer re-duced to 32° ^ø	Barometer re-dueed to 32° ^ø	Temperature.	Wind.	Aspect of the Sky.	Barometer re-duced to 32° ^ø	Barometer re-dueed to 32° ^ø	Elevation.	Upper Foot 40	Lower Inch
1	In 29.736	91.5	91.3	81.8 S.	29.605	97.7	96.0	81.7 S.	Cumuli.	98.8	..	..	..	..
2	.669	94.7	93.9	80.7 S. W.	.536	100.3	94.6	76.2 S.	Cumulo strati.	104.2	..	..	..	..
3	.661	93.1	92.5	76.9 S. E.	.516	100.9	75.0	73.0 S. W.	Cumulo.	105.3	..	..	..	..
4	.693	93.2	92.2	80.5 S.	.526	100.0	97.8	77.8 S.	Ditto.	102.5	..	..	..	..
5	.703	93.0	93.0	80.9 S.	.568	97.2	95.0	79.3 S.	Clear.	101.9	..	..	..	..
6	.639	92.0	92.0	82.4 S. W.	.535	99.0	97.3	81.5 S.	Cirro cumuli.	99.8	..	..	..	..
7	.663	91.7	91.8	82.4 S.	.568	96.7	94.8	82.9 S.	Cumuli.	99.8	..	..	..	..
8	.716	90.8	90.8	81.3 S.	..	..	..	..	....	99.0	..	..	..	..
9	.857	94.9	92.3	80.6 S.	.743	88.3	89.8	81.7 S.	Cloudy.	98.2	0.24	0.33	..	..
10	.848	90.7	89.5	80.4 S. W.	.669	94.9	93.3	80.0 S.	Cumulo strati.	98.2	0.14	0.22	D	..
11	.778	91.2	90.0	80.4 S.	.649	93.2	92.1	79.0 S.	sharp.	96.8	..	..	..	..
12	.744	91.0	90.5	82.2 S.	.626	95.4	94.5	81.2 S. W.	Clear.	97.5	0.40	0.46	O	..
13	.781	89.0	87.5	79.3 S. W.	.672	94.0	88.2	83.0 S.	Cirro cumuli.	97.6	..	..	..	..
14	.759	91.6	91.2	82.2 S. sharp.	.628	95.7	94.4	81.2 S. W.	Cirro cumuli.	97.4	..	..	..	..
15	.625	92.2	91.4	83.2 S. diuto.	.496	95.5	94.2	82.3 S. sharp.	Gloomy.	97.1	..	..	..	..
16	.616	92.5	91.8	83.4 S. diuto.	.492	96.2	95.0	83.3 S. sharp.	Clear.	98.7	..	..	..	..
17	.692	92.1	91.2	82.8 S.	.543	96.4	94.3	83.0 S.	Cumuli.	98.8	..	..	..	..
18	.780	89.4	87.3	80.5 S. E.	.599	94.8	93.5	83.6 S.	Ditto.	95.9	0.32	0.36	O	..
19	.626	90.3	89.6	80.4 S. W.	.593	94.8	93.8	82.8 S.	Ditto.	95.9	1.16	1.20	..	..
20	.585	87.0	86.8	81.0 S. sharp.	.459	95.3	93.4	81.4 S.	Ditto.	95.5	1.10	1.19	..	..
21	.629	85.4	89.9	83.6 S. sharp.	.473	90.4	89.0	83.0 S.	Ditto.	92.6	0.06	0.10	..	..
22	.554	90.0	89.9	83.2 S. sharp.	.473	94.0	92.2	84.0 S.	S. W. Clear.	94.1	1.36	1.38	C	..
23	.629	90.5	89.9	83.6 S. ..	.523	95.2	93.5	84.4 S.	....	96.4	0.46	0.56	C	..
24	.679	92.2	90.8	81.9 S. ..	.576	94.6	92.4	83.8 S.	Cumuli.	96.0	..	..	..	..
25	.709	92.2	91.5	83.6 S. W.	Ditto.	..	..	..	Cirro ditto.	96.3	0.05	0.07	..	..
26	.743	89.8	89.4	80.4 S. W.	Ditto.	..	..	..	Cirri.	97.0	..	..	..	..
27	.684	92.4	92.0	83.0 S. W.	Cirro ditto.	..	..	..	Clear.	95.7	..	..	..	..
28	.702	91.2	90.6	81.3 S. W. sh.	Ditto.	..	..	..	Ditto.	96.1	..	..	..	..
29	.737	90.6	90.0	81.5 S. W.	Ditto.	..	..	..	Cumulo strati.	97.8	0.12	0.19	..	..
30	.744	88.3	86.9	81.3 E.	Ditto.	..	..	..	Ditto.	92.8	0.10	0.16	..	..
Mean	29.702	91.4	90.6	81.5	29.571	95.6	93.9	81.4	..	5.51	6.22	97.7	..	..

JOURNAL
OF THE
ASIATIC SOCIETY.

JUNE, 1848.

Notes on Ancient Temples and other remains in the vicinity of Suddyah, Upper Assam.—By Major S. F. HANNAY. Communicated by W. SETON KARR, Esq., Under-Secretary to the Government of Bengal.

Being desirous of making some researches in the jungles north of Suddyah for the remains of the former inhabitants of that section of Upper Assam, I took the opportunity of my yearly visit to Laikwah, to make excursions in the different directions pointed out by the villagers as leading to temples, tanks, and other remains of a people different in every respect from the present races inhabiting the country, and who are associated in their ideas with the Demigods and Deotas of ancient Hindooism.

Bishmook Nuggur.—This is a Hill Fort; built according to the traditions of the people of Upper Assam, by a rajah of that name (Bishmook), whom the Hindoostanees appear to identify with Bheekrum, rajah of Koondilpoor, the father of the celebrated Rúkhmáni. It is situated at the foot of the mountains nearly north of Suddyah, between the Dikrung and Debong rivers, and may be distant about 16 miles.

In proceeding to this Fort, we passed over the Suddyah plain in a northerly direction, and at a distance of about six miles came out on the Dikrung river, up the bed of which we continued our course on elephants, till the morning of the 3d day, when we reached the hills. The route was then on foot, through the tree jungle on the right bank of the river, winding along the tracks of wild elephants (but more frequently obliged to cut our path) for about two hours, when we found our-

selves at the foot of a steep ascent of 80 or 100 feet, up which we scrambled to a fine piece of table-land covered with splendid timber, amongst which we observe the Jack, Toon and Tchaum. Here our guide, whq by the bye had never seen the Fort, said we had reached it, and mentioned that the tract of table land covered with various fruit trees extended inland to the foot of the Guroee mountain.* No vestiges of architecture were visible however, and we were thus disappointed as in the absence of any knowledge whatever as to localities, it would have been too laborious an undertaking to explore such an extent of country. It was agreed upon therefore to proceed for some distance along the edge of the steep bounding the table-land on the left, in the hopes of finding a road or path which might lead to a gateway, and perceiving in our course one or two paths, well worn by wild animals in their progress to water, we passed down one of these, and were fortunate enough, after turning and winding through the hollow ground formed by the steep we had just left, and an opposite spur of the elevated land, to discover that a high rampart of earth crossed the opening towards the plain ; crowning this, we found ourselves amongst bricks scattered about, with a low wall running along the top of the outer edge, which on nearer inspection proved to be an upper parapet overtopping the rampart, the lower portion showing a solid facing of hewn sandstone blocks, of more or less height, according to the nature of the ground.

This rampart ran in a direction about North West, and in the distance of $\frac{1}{4}$ mile, which we inspected, the brick wall continued on the left, sometimes to the height of five feet, loop-holed in several places, apparently for arrows and spears, but more frequently in a very dilapidated state from huge trees having taken root in the rampart, and wild animals passing over it. At the distance of $\frac{1}{4}$ of a mile, a spur of the table-land touched upon the rampart and a brick wall crossed it, ascending the spur apparently to the level land above ; here also must have been a gateway or passage of some kind through the cross wall, but all had

* Guroee Mountain, and also Geree, so called from a tribe of Mishmees inhabiting the lower spurs. The Thi Gurœe is North of Suddyah, and in a direct line about 20 miles distant. The highest peak must be upwards of 8000 feet, being often covered with snow in the cold season, and behind it are seen several snow-capped mountains of a higher range. The Diggaroo and Dikrung rivers rise from the Southern slopes of this mountain, and the former brings down those beautiful boulders of primitive limestone-marble which supplies Western Assam with lime.

disappeared in the heaps of bricks lying about. The wall and rampart however still continued to the north-west, but having so little local information about the place, and being limited in our researches to that day only, it was considered advisable to return. We therefore confined our further observations to that portion of the works we had passed.

Conjectures as to the nature and extent of the works.—The table-land to the east being naturally strong from the steepness and difficulty of ascent, required no artificial defences, and from the circumstance of the rampart and wall abutting upon the southernmost point of the table-land, it appeared to me evident that those works, to their utmost extent westward, probably to the Dibong, about 4 miles distant, were merely intended to enclose the table-land at the foot of the hills, and thus form a place of refuge in time of invasion. The quantity of fruit trees, such as Shamm (*Artocarpus chaplasha*.) Jack and Mangoe, would also lead us to suppose that the place had been peopled, or at least that it had been occasionally occupied as a summer residence. No buildings however are said to be on this hill fortification, but the Mishmees, who describe it as of great extent, speak also of a gateway by a hill stream, where there are large earthenware vessels similar to the *Naud*, used for holding water, besides other smaller vessels of various shapes; and the truth of the latter is confirmed by the numerous debris of earthen vessels found in the bed of the Dikrung river, of a description totally different from the manufactures of the present day in Assam, being more (as regards quality of material and shape) of that of the earthenware of Gangetic India.

Description and quality of works.—Although bearing the appearance of great age, for in many places the wall has bulged and fallen down, it has evidently been well and substantially built; the sandstone blocks, varying from 10 to 8 inches thick, 1 foot broad and 20 inches long, are rudely, but evenly chisselled with the point, and they are closely and regularly laid. The bricks are first rate, varying in size from 8 to 5, and 6 to 4 inches, and from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches thick, and the parapet wall formed of these, about 4 or $4\frac{1}{2}$ feet in thickness. The sandstone facing of the rampart may be somewhat less, but the whole masonry work is laid without cement or fastening of any kind; immediately over the sandstone, are two rows of bricks, and over these two others projecting, so as to form a rude cornice, which gives an appearance of neatness.

The rows or layers of masonry (sandstone) alternate from 5 to 7 and 9 from the bottom of the wall outside, a difference which may be accounted for either from the natural steepness of the ground in some parts, requiring less wall; or from the earth having accumulated against the wall from natural causes, during a long period of time. Close to where the wall abuts against the table-land, there is a turn at right angles given evidently to form a flank defence. No writing or rude marks on the stones such as I subsequently found at other places, were discovered in this hill fortification.

The Tamaseree Mai, or Copper Temple.—This temple is designated by Buchanan “the Eastern Kamykya,” and its site is stated by him to be on the Dikkori Basini, near the north-eastern boundary of the ancient kingdom of Kamarupa.

The small romantic little stream, on the right bank of which it is built, is not the Dikharoo river however, although in its course to the Burrumpooter it receives several accessories from that river. Dol, or Dówl panee, is the name by which the temple stream is known to the Assamese.

Formerly, and whilst the remains of the Hindoo races on the north (right bank) of the Burrumpooter were still unmolested by the Ahom or Shan dynasty in Assam, the eastern Kamykhyā was accessible from Western India, by that stupendous work the raised road or alley, which is known to have extended from the modern Kooch Bchar to the Eastern confines of the Assam valley;—subsequently also, as the Ahoms became proselytes to Hindooism, although their zealous policy excluded people from Western India, the natives of the valley had permission to propitiate, and I believe a road went direct through the present Suddyah to the Temple, or via Choonpoora or Sonipore of the maps, a place on the north bank of the Burrumpooter, the residence of the Suddyah Kwa Gohain, an officer of the above government, in charge of the eastern districts of Assam. Choonpoora is about 10 miles east of the present station of Koondil Mookh, and the Temple may be about 8 miles inland from Choonpoora, in a north-east direction.

A generation and more has passed away since the votaries of this Temple were numerous enough to keep the roads open, and the only accessible route now-a-days, is by the course of the Dálpanee, up which the anxious pilgrim frequently wanders for days without being able to find the object of his search, for the country is one mass of dense jungle,

and so many streams fall into that which passes the holy spot, that even those who have visited the place, and ought to have a knowledge of the landmarks, are frequently puzzled, that an idea prevails, that the goddess, or titular deity of the Temple, is to be found and propitiated only when it pleases herself. I believe indeed that in more than one instance, pilgrims have returned ungratified; and Byrages and others from Western India, in attempting to find the Temple alone, have perished from hunger, or become a prey to the tigers, which are numerous.

According to the accounts of my learned Hindoo friends, the worship at the eastern Kamykhyā is the Yoni, but more properly the Linga of Siva, in conjunction with the Yoni. Siva has also been propitiated in his character of the destroyer, and it is well known that human sacrifices have been made there within the present century. I have not been able, however, to ascertain the date of the last sacrifice, and whether it existed up to the invasion of the Burmese, but I have been told as a positive fact, that the particular class of people from amongst whom the victims for such sacrifice were taken, are still in existence, and one family is now living in Suddyah. However, I have not made any particular inquiries regarding so barbarous a rite, and will merely observe that orthodox Hindoos do not admit the necessity for human sacrifice at the Eastern Kamykhyā,* and account for its introduction, by the barbarity and ignorance of the people. My own opinion is also in favor of this, and the probability that it was so introduced by the Ahoms in their early ignorance of Hindooism, or that some wily and bigotted brahman, may have made it a price for the liberty of proselytism to his creed, the sects of which in Assam, the Ahoms, following their advent into the country, had long persecuted.

That Hindu Buddhism and Brahminical Hindooism both existed from a very remote period in Assam, I think we need not doubt, as well as, that the latter came down to a very late date; of which indeed, there can be no better proof than the fact of its influence having led to the conversion of the Bhuddistical Tai race who had become the rulers of the country.†

* Kamykhyā should be more properly written Kam Ichchha, from *Kama* and *Ichchha*.

† According to Hiouan thsaang, Buddhism had made no progress in Assam up to the middle of the seventh century. The Tibetan accounts which make Assam the scene of Sâkyâ's death, are now well ascertained to be in this respect erroneous.—Epa.

Admitting also that the kingdom of Kamroop had attained to an equal degree of civilization with coeval Hindu dynasties of central India,* there is nevertheless but little doubt of its having fallen away into a state of anarchy and barbarism, for centuries perhaps, before the middle of the 15th, and this from the influx of impure tribes, on every side ; and their mixing up with the original inhabitants of the plains.— The advent of these having followed upon the dying off of the former dynasties, or their downfall by invasion from Gangetic India, of which last there are two mentioned, that of the Emperor Vicramaditya and of Yitarit a pious Rajput, from Western India, who was the founder of a dynasty in central Assam, which became extinct with Rajah Sukrauk in 1478 A. D. X

Indeed from whatever cause, its beauty, extraordinary fertility, and richness,—or perhaps the unwarlike character of its inhabitants,‡— it is certain we hear of Kamaroopa having been the prey of the invader from India, from the time of its being the abode of the primitive Assurs, and Deotás,§ to the last invasion of the Mahomedans of Bengal in the middle of the 17th century ; I am inclined however to give its downfall from former greatness, a very early date, at least to a period prior to the first Mahomedan invasion of Kamroop, and would attribute it solely to the peculiar tenets of its people (the worship of Siva) and the prolonged struggles which in former times took place throughout India, between this and the opposite sect of Vaisnava ; and here also we shall find the true cause of the unfinished and ruinous state of the extensive remains in central Assam, as also on its Eastern confines, and not ascribe the desecration, either to the rude hand of the Mahomedan, or the Shan invader.|| About the middle of the 15th century, and perhaps

* The extensive ruins of Sonitpoor or Lohitpoor, as described by the late Capt. Westmacott, prove this I think, and in the praises of Chandragupta, as translated from inscription No. 2 of the Allahabad Pillar, and published in J. A. S. for June 1836, we have in stanza 19, “ Of him who when his fame penetrated to the friendly forest of Pines, to Kamarupa, to Nepal,” &c.

† Generally known as Dhuram-pal.

‡ In latter days at least.

§ In thus alluding to the Assurs and Deotas, I am of opinion that Assam or Kamaroopa was one of the earliest conquests of Indian Khetri kings, and the seat of that primitive Hindooism, (or shall we say Buddhism,) which existed previous to the Brahminical or priestly doctrine which superseded it.

|| The first invasion of the Mahomedans is stated to have been in the partly part of the

before the death of Sukrauk, the last of the Yitari or Dhuram-pal line in A. D. 1478, a revival of Hindooism according to Brahminical tenets, appears (from Prinsep's Chronological Table of the North bank Bur-rumpooter dynasty) to have been carried out, by the introduction of Brahmins from Gour, and from this time, we may date a gradual extension of its influence over all classes, the Tai rulers of the country having become proselytes somewhere between 1611-49. After the death of Sukrauk without issue, the different classes of the people, appear by the same Chronological tables to have been formed into 12 Rajs, known in Assam as the Báráh Bhóóceáh—these however, soon came under the dominant power of the Ahoms, who commencing with the Cassarees and Sooteeals on the East, slowly but securely extended their supremacy by force and intermarriage, until they eventually assumed the sovereign power to the confines of Bengal.

Structure of Temple and style of architecture.—The Temple is situated close on the right bank of the romantic little stream, called the Dolpanee in the midst of a dense forest, in which there are some splendid specimens of the Nagasur. The dimensions of the interior is a square of 8 feet, the walls being about $4\frac{1}{2}$ feet thick, excepting in front, where there are two recesses on each side of the door, which is formed of three entire blocks of stone. The outer line of wall therefore encloses a square of about 17 feet. With the exception of the lintel and sides of the doorway, (Pl. XXX, fig. 1) the four walls are quite plain, both inside outside ; from the basement outside however, at the height of 10 feet, there is a projection of stone slightly fluted on the underside, which forms a cornice, and above this there may have been about 2 feet more of wall upon which the roof rested, as not a vestage is remaining of this last, it would be difficult to speak confidently of its particular construction, but as there are several long pieces of stone, levelled at the lower end which have fallen inside, it is possible that these may have formed the groins of support to the roof—eight in number—the intermediate spaces between these, being filled in with thin slabs, of which there are many lying about, and the whole covered over with sheets of beaten copper, laced together through copper loops fastened on the

13th century, but it does not appear that they penetrated beyond Rungpoor, Bengal, which anciently belonged to the kingdom of Kamarupa.

edges of the different sheets ; as the groins however, are not above 5 or 6 feet long, the roof must have been rather flat ; a carved vase-shaped block, now lying in the river, in all probability formed the centre of the dome. The Linga, two in number, are in the middle of a large stone inside, and accessible by a descent of a few steps from the doorway ; in which there was a folding-door of stone or wood, judging from the hole at top and bottom on each side.

The style of architecture is ancient, but I should be inclined to think the present building of comparatively modern date, from the circumstance of finding a thin layer of brick *soorkee* or mortar between the rows of masonry ; if such is the case, we might reasonably suppose it had been rebuilt about the time of the revival of Brahminical Hindooism, as before noticed. The original shape has without doubt been adhered to, and the same material employed as on its first construction. This looks old, and bears marks of iron fastenings now completely decayed.

Building material of Temple and enclosure.—The material of the temple, with the exception of the door lintel sides, and projecting wall on each side, is a course grit, well adapted for building purposes. The blocks averaging from one foot thick, the same in depth, and 18 inches long, are smoothly chiselled, and the masonry is evenly and closely fitted. The three blocks forming the doorway, each of $7\frac{1}{2}$ feet long and 2 feet by 18 inches in girth, with the blocks of the projecting wall, are reddish porphyritic granite of an adamantine hardness ; and must have required exceedingly well tempered tools to work, the chiselling being with the point in straight lines, which give a ribbed appearance.

The site of the temple is as near as possible square with the cardinal points, the doorway to the west, the back wall having only a space of 12 paces between it and the wall of the outer enclosure, which on the east, rises directly up from the right bank of the stream. This is a substantial brick wall, about $4\frac{1}{2}$ feet thick rising to the height of 8 feet, on a foundation of rudely cut blocks of sandstone. The entrance of this enclosure is on the west face, where there has been a stone gateway and door, of which the lintel carved on the edge in a chain of lotus-flowers, is lying close by, as well as some ornamented small pillars upon which in all probability the elephant* (Plate XXX. fig. 2.)

* The tusks of this elephant are said to have been of silver. The block from which it is cut measures 4 feet in length, 2 feet high, 18 inches broad.

was placed near the doorway ; at the south-east corner, there was also a stone gateway leading to the small stream, in the bed of which are several carved and plain blocks of granite and sandstone to which it would be difficult now to assign a place ; one of these is the triangular shaped weather-worn block of granite (Fig. 3, Pl. XXX.) on which are symbols, which perhaps may have some meaning, and give a clue to the era of the building ;—one or two of the letter-like figures, assimilate with some of the characters of the ancient Nagree alphabet, but the shaded figures are too deeply cut to suppose they are more than symbolical of a particular era and people. On some of the blocks lying in the river, and in the foundation of the enclosure wall, as also on the elephant, I found the marks, represented at 1, 2, 3, 4, 5, of Pl. XXX, and which I fancy are typical of the sect of the mason, or of the builders. In front of the temple, and lying between a small brick terrace opposite the door, are several round-shaped plates of granite sunk to a level with the ground, upon which offerings are said to have been placed. The brick terrace has a low wall on three sides, now in ruins, but the outer enclosure wall is in a tolerable state of preservation, and along the inside of both eastern and western faces, brick tiles about 14 inches square are let in, having stamped upon them in high relief, figures of some of the Hindoo Avatars ; the principal are the caparisoned horse—the same with warrior, in a high conical cap,—Hunooman,—the fabulous horse and tree,—two peacocks fighting,—one bird preying on another, with a variety of flowers of the Lotus, Cham-pa, and Nagasur, done in different forms ; most of the figures are dressed in the conical shaped cap ; but I am inclined to think, this wall and its embellishments, are coeval with the second building of the temple about 400 years ago.

The present ruinous state can be easily accounted for by the jungle having grown up so thick around it and upon it ; for it is quite impossible that such buildings could stand when once trees and shrubs had taken root on the walls, as one stone displaced, the roof would soon come down. The present state of dilapidation is however ascribed to an earthquake about 5 years ago, no doubt assisted by the numerous wild elephants who tear down the shrubs from the highest points they can reach, and rub themselves against the walls.

Altar of worship called Boora Booree.—Following my visit to the

Copper Temple, I was induced from the reports of Deoree Sooteeahs* of Suddyah to visit a temple or place of worship, situated close on the left bank of the Dikrung river, and to look for other remains which were said to exist in the Doab, or tract of country lying between that river and the Debong, connected, according to the traditions of the people, with the Rajah Bishmook before mentioned, and his capital of Koondilpoor.

We found this temple of worship about 10 miles distant from Suddyah, the last four miles of the road lying along the bed of the Dikrung to the mouth of a small stream on the left bank, called the Deopanee, in the immediate vicinity of which it is situated. This extraordinary looking place, represented in sketch No. 3, and rough ground plan annexed, is considered by the natives of the district, the most ancient and holy spot in Upper Assam ; and the source from which all other objects of worship have sprung, not even excepting that of the Copper Temple. By the orthodox Hindoos, it would be considered an altar to Mahadeo, or Siva and Parvatti, with their attendant Gunas. From its shape and the number of the Linga however, I

* The Deoree Sooteeahs are the hereditary officiating priests of the copper temple, and Boora Booree. They belong to a class of the Assamese population deserving of notice, as the Sooteeahs or Choootyahs, who at one time previous to Ahom supremacy held power on the North and South bank of Burumpooter, in the modern district of Suddyah and Saikwah, and according to their own account, are descendants of the original Hindoo Khetree races of ancient Kamarupa. (The family of the late Muttack Senaputtee are Choootyahs). This tradition might derive some corroboration from the fact, that the language of this race, now only known to the families of the priests, contains a great proportion of Sanscrit and Hindee as well as Burmese words, which last are probably derived from Pali, and the whole language may therefore have been originally one of the Pracrit dialects of the day ; according to the Tai races also, the " Khwam Choootyah (or Choootyah,) language appears to have been the only written language in existence at the period of their advent in Assam ;—and it is notorious, that both Burmese and Shans substitute the Y for the R, and we would then have it written more like Xshatrya or Chuttryah. In the present time the Sooteeahs are called Hindoo Sooteeahs, and Ahom Sooteeahs, the last named being those with whom the Ahoms or Saums intermarried at an early date. The class of the Assam population known as Beheeahs in upper Assam, also consider themselves belonging to the Hindoo Sooteeah family. With reference indeed, to the characteristic features of the different people in Upper Assam, it may be generally remarked I believe that amongst the Choootyahs—Beheehas and Külitas who have not intermarried with the Saums, the high and regular features of the Hindoo predominate. Many of the latter indeed are very well featured, with the grey eye which we frequently find amongst the Rajputs of Western India.

should be inclined to think that no better explanation of its original and peculiar worship could be given, than what is written of the attributes of Adi Buddha, and Adi Prajna, in the quotations from original Sanscrit authorities on Buddhism, published in the Journal of the Asiatic Society for the month of Feb. 1836.

The altar is a hexagon, each face measuring about 8 feet inside. The architecture quite plain, the wall two feet thick, showing on the outside from the foundation 5 rows of sandstone blocks, varying from 10 to 8 inches thick, the masonry bound together with iron clamps. The inner side of the wall is brick, and on the top is a coping of brick soorkee without lime, which last looks like a comparatively modern addition. The whole space inside has been paved with rough flags of sandstone; and in the centre, placed north and south, is a large slab shaped like a gravestone, containing the Linga, as represented in the rough ground plan.

In front of the altar on the West side, is a terrace or choubootra, upon which offerings are placed.* In later days, since the proselytism of the Ahoms, and the re-establishment of the worship at these temples, the Boora Booree had a light roof supported on posts, covering the whole space; this however is long since decayed and gone.

At a distance of 180 feet from the North-East corner of the altar is an outer rampart and deep ditch, corresponding exactly with the inner hexagon; and at a somewhat less distance is another, but lower rampart of the same shape. There is no gateway, or the remains of one, visible in these outer works; but a raised road leads out from the Western face of the altar; within the first enclosure, also in the North-West corner, is the remains of a small tank, and about 20 paces in front of the terrace is an upright stone (sandstone) with a moulding on the edge, placed there I was told for sharpening the dhas of sacrifice. The whole space is a dense jungle, and the site of the altar had to be cleared, before it could be examined; within the enclosed ground, as well as on the inner rampart, are some of the most magnificent Nahor trees I have ever seen. The surrounding jungle (underwood) is mostly the wild Betelnut (as it is called,) and the vicinity of the spot

* The most esteemed offering made at this temple is a white buffaloe, but pigeons, kids, and ducks are also sacrificed along with offerings made of money, cloth, opium, flowers, rice, and in fact every article of food.

is notorious for the number of the Sewah Palm (*Caryota Ureus*). Toon of a large description, and other timber trees, common to upper Assam, are also in abundance.

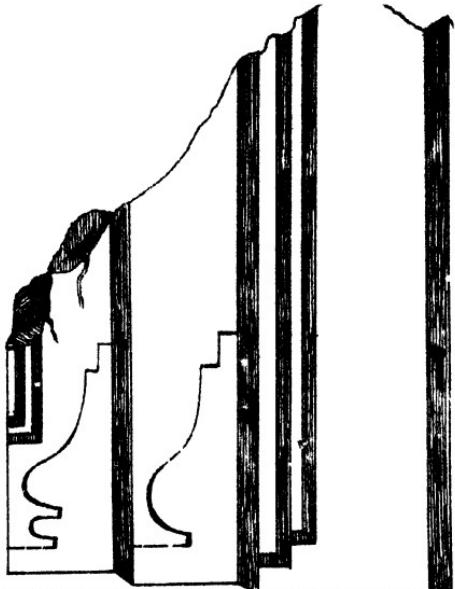
During a sojourn of a week on the banks of the Dikrung river, daily excursions were made into the jungle, in the hopes of finding the remains of another temple and tank, said to exist in, or near the site of an ancient place called Pritthimee, and by some Phoontook Nuggur ; situated between the Dibong and Dikrung rivers there, about five miles apart.

The result of our searches (although not fortunate enough to find the temple and tank we looked for) were three very fine pucka tanks, all of which were, in form, a parallelogram, three times the breadth in length, with two opposite bathing ghauts, exactly in the middle of the embankments, which last were built of first rate bricks, laid in three steps or ledges to the water's edge and without lime or soorkee, the upper surface of the embankment being also paved with bricks.

One of these tanks, situated several miles inland, was by rough measurement, 280 yards long, by 96 broad, and the site lengthways, north and south, as near as possible. The bathing ghauts, although ruinous, were built of hewn blocks of sandstone, flags of the same stone shield shaped, as at No. 8 of typical marks (Pl. XXX,) forming the side-ways. Here also, on detached blocks from these ghauts, I found inscribed the Fursah or Battle-axe, and other marks similar to those of the Copper Temple.

On the embankments near the ghauts, were several very large Bani-an trees ; and besides numbers of fine Nahor, we found the Neribi, (*Canarium strictum*), Tapor (*Xanthochymus pictorius*), and other fruit trees ;—the surrounding small jungle where the ground was high and dry, was invariably the wild Betelnut, with an occasional Sewah.

Another of these tanks is situated close on the right bank of the Dikrung, and from its immediate vicinity a high rampart of earth with a ditch, proceeds south-west and west, circling round for several miles north-west to north, at which point we found the remains of a brick gateway, with rampart, and the tank I measured, close to it ; a road also proceeds from this point to the westward (afterwards traced as far as the Dibong). In front of the gateway, is a small water-course, or continuation of the outer ditch, on each side of which were the remains of buttresses of hewn sandstone, and some large slabs were lying



about ; it is evident therefore that a bridge crossed the ditch at that point.

None of the natives who accompanied us had seen these remains, and of course had no knowledge as to the extent of country enclosed by this rampart ; but as it is some 18 feet high, with fine timber growing upon it, it is quite possible to trace it to the point where it again perhaps touches on the Dikrung. The tanks we found are all inside this rampart, and as others are reported to be in existence, we may conclude that it enclosed the site of a large town or inhabited tract of country. In fact, from the accounts of different people who prowl about these jungles elephant-shooting, and who describe various works of brick and stone,—high earthen mounds, with tracts of cultivatable land intermixed, I am inclined to think that the country from the Dibong to the Koondil river, a distance of 10 or 12 miles, with the hill fortification known as Bishmook Nugger, and Sisoopal Nugger,* belonged to one people and dynasty. It is indeed quite obvious that the masonry either of brick or stone, which we examined, is the work of the same people, and that the sandstone is the produce of one quarry, apparently of the old red sandstone formation, which we might expect to be in existence on the southern edge of the neighbouring mountains.

Our researches on the Dikrung ended with the discovery of the carved block of sandstone, represented in Pl. XXXI. This stone, $7\frac{1}{2}$ feet long by 18 inches broad, and 10 inches thick, was found inside a substantial brick enclosure 96 by 84 feet, built without lime or mortar, but of the finest bricks I have ever seen ; some of them in the doorway (situated in a buttress in the west face) 18 inches by 1 foot, and $3\frac{1}{2}$ inches thick, the wall $4\frac{1}{2}$ feet in thickness, and upwards of 6 feet high, the coping of entire bricks included.

In one corner of the enclosure was a well, made with the tile rings used in Bengal, and close to the eastern wall was a brick terrace, upon which the stone was placed parallel to this face. The inner side (which was uppermost), was divided by a ledge $1\frac{1}{2}$ inches high, into 3

* I am at a loss to know why this place, which was visited by Lieut. Rowlatt, is so called. Sispa, or Sisupal, who was Rajah of Chanderi in Bundekund, may have accompanied his cousin Krishna in his wanderings ; but he could have had no connection with the country of Bishmook beyond this, if we may except the story of his having been betrothed to Rukhmíni, the daughter of Bishmook, and if we can believe that the Bedhurb of the Hindoos is the modern Suddyah, and the Koondilpoor of the Prem Sagur.

compartments, the centre containing 3, the others 2, in all 7 cavities, which led the natives of the present day to suppose the stone had been used as a *Dhenkiri*, for pounding rice.

There can be little doubt however of the object of the people who placed it in the position we found it ; as well as, that its dimensions, and clearly sculptured face,* shows that at one time it formed the left hand side of the door of a temple, and taking into consideration that this building was at a considerable distance from the works enclosing the tanks, &c. we may reasonably imagine that the stone with the whole of the brick work was taken from the site of the temple, we were in search of, and to a certain extent corroborates the reports of the natives as to its existence within the site of Pritchimee Nugger, the discovery of which however, must depend upon further researches in that quarter.

In the present time it would appear difficult to account for the existence of such extensive remains of population so far inland from the Burrumpooter. The traditions of the people however go to say, that the course of this river eastward of Suddyah even ran in former times much nearer to the northern mountains, but at what particular point the Burrumpooter subsequently receded from the hills, cannot now be well determined ; as the land is high at Choonpoorah, and continues so, as far inland at least as the Copper Temple. It is evident notwithstanding, and it is the current belief of the people, that the extensive plain of Suddyah is an alluvial deposit of no very ancient date. I have seen indeed, when the Burrumpooter was encroaching upon the station of Koondil Mookh, drift timber of immense size exposed by the abrasions of the river, and at the mouth of the Koondil, it appeared as if a forest had once existed, under the Suddyah alluvial deposit ; which I believe, at the highest, is not more than 16 feet above the dry season level of the water in the river.

As the Suddyah land falls again inland at about 4 or 5 miles distance towards the Goormoorah Nuddee, it is possible that this last may in former times have been the bed of the Burrumpooter, which would thus have joined the Debong, where the Dikrung and the united waters of the Goormoorah now fall into that river. This would bring the remains of Pritchimee and Bishmook within a reasonable distance of the great river of the valley.

* The figure on this stone is supposed to be that of Krishna ; lying alongside of this was a smaller block, the edge carved in a chain frieze, apparently part of a cornice.

Description of the Tomb of an Ahom Noble, in a letter to Major S. F. Hannay ; by Serjeant C. CLAYTON, Depart. Public Works.—Communicated by W. SETON KARR, Esq. Under-Secretary to the Government of Bengal.

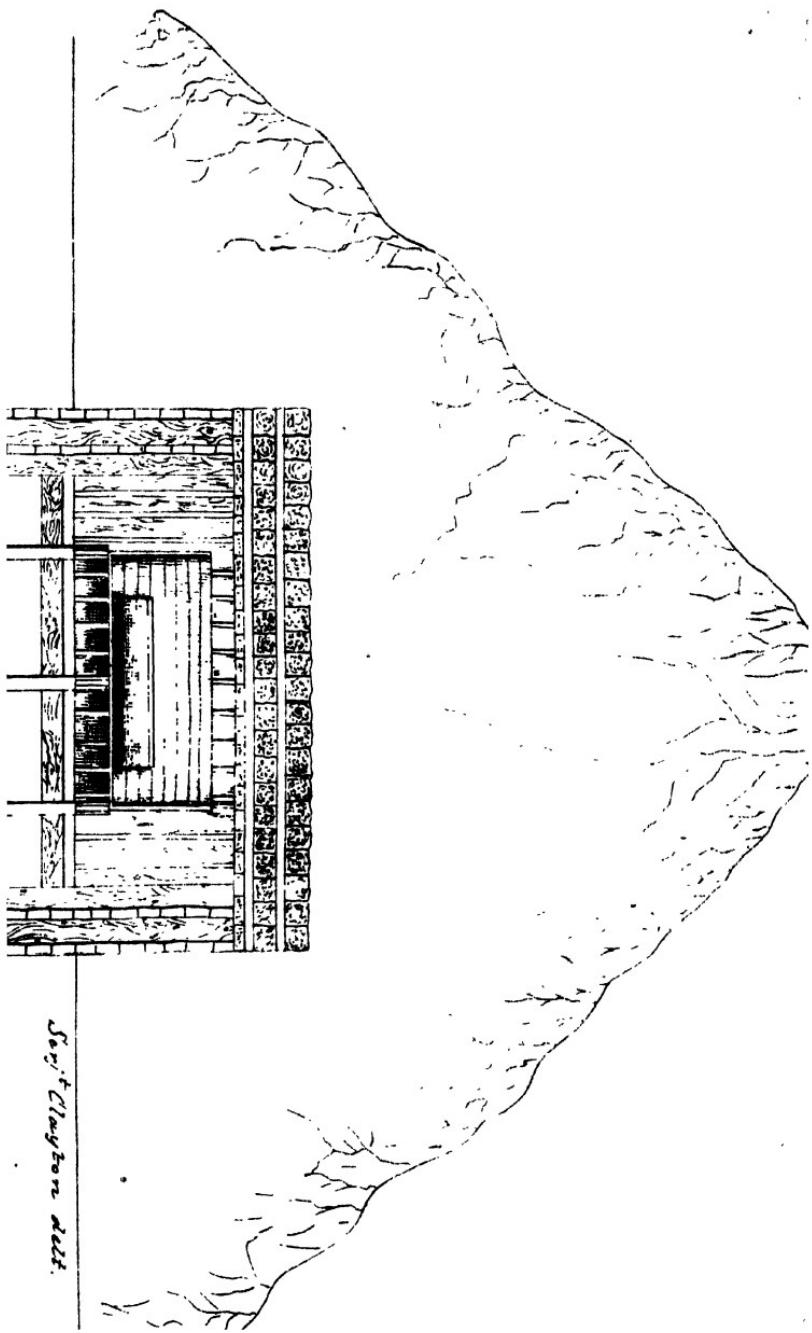
In compliance with the request contained in your note of the 19th instant, I beg herewith to enclose a rough Plan and Section* of the "Maidom" or Tomb, of which I superintended the opening at the request of Captain Brodie.

The Tomb is said to be that of the Burra Ghohain "Purnananda," who exercised great authority during the latter part, and after the reign of Gowrienath Singh ; it was built entirely of massive timber of the dimensions shewn in the plan, the posts and beams being of Nahr and the plank of Oriam all in excellent preservation.

The shell or coffin was placed upon a mechan, not in the centre of the room, but much nearer to the north side ; and from the upper edges of the mechan rose a wall of thin rough boards enclosing the coffin on all four sides but open at top, which however rose to within a foot of the main roof. The coffin was placed east and west, but there was nothing in the shape to shew the head from the foot ; it was something wider at top than bottom, and the lid (cut from a single plank) was slightly convex outside, and hollowed within ; it rested on a groove cut round the edge of the coffin to receive it, without any other fastening. Under the coffin were four legs or stands, with a cross-bar connecting each pair ; they were of very rough workmanship, similar to the commonest sort used under the cots of the natives. One peculiarity in this tomb from others that I have seen, was the total absence of iron work in the shape of nails, bolts, or other fastenings from every part of it. Within the coffin, not the slightest vestige remained of its former occupant, if I may except a quantity of ashy looking dust over a thin layer of sand ;—the personal ornaments, such as rings, toothpick case, ear ornaments, &c. were all in one spot about the middle of the coffin, or as if placed under or near where the hand might have been, and not in their usual places about the person. Outside the coffin, on the platform of the mechan were placed the eating, drinking and cooking vessels, but the whole of those being of copper or brass were so much decayed as

* We have given the Section, which is sufficiently intelligible without the Plan, in Plate XXXII.—*Eds.*

to render it difficult to say what they had formerly been. The only other articles taken out of this tomb were two or three small iron hatchets of the common Assamese pattern, and as a guard was kept over the place from the time it was practicable until I searched every part of it, I am convinced that nothing was taken out clandestinely. The most valuable article found in the coffin was a small gold vessel for holding "chuna" or lime to be used with the beetle nut, and which I have been told was afterwards purchased by Mr. Bedford. The tooth-pick case was silver, and the gold ear-ornaments were deficient of the usual ornamental stones at the ends. This tomb was, I am afraid, of too recent a date to answer the purpose of comparison, for which you required the description. Robinson's "Assam" makes no mention of the particular time or circumstances of this Burra Gohain's death; but I have met with two or three elderly men who stated they could remember it, and I am inclined to think that it must have taken place so recently as 1810-11, during the reign of Chundra Kanta Singh. The tradition regarding it is as follows:—Immediately after the accession of Chundra Kanta the Burra Ghohain received private intimation that the Rajah had joined in a plot against his life, and that the Bar Phukan was a principal leader in it, he therefore used every means to get the latter into his power, who however fled from Assam to Calcutta, and afterwards to the Burnese Court, from whence he returned to Assam with a powerful force, and on arriving within a few marches of Joorhath, he is said to have addressed two letters, one to the Rajah, stating amongst other matters, that he had already prepared instruments of torture for the purpose of putting to death his old enemy the Burra Gohain; and the second addressed to the Burra Gohain in terms of the greatest friendship for the purpose of getting him into his power;—the letters by some accident were exchanged, that to the Rajah falling into the hands of the Burra Gohain, who despairing of escape, suffocated himself by swallowing a large daimond. I trust you will excuse my troubling you with this digression, but I have thought that however exaggerated, there was probably some little truth in the leading points of the story; and if so, the position of the Burra Gohain at the time, together with the troubled state of the country, will account for the apparently rough way in which so great an officer was interred, and the trifling articles of value that were found with him.



Sainte-Claire-de-Neige

I have seen the interior of another old tomb after it had been plundered, in which was also a coffin, and the general plan of the place was precisely similar to the one I have described.

A third that I had an opportunity of seeing, differed so far as regards the substitution of a bedstead highly ornamented with carved wood work for the coffin ; and from this grave a small portion of the bones of the head and other parts were taken out ; a great number of jars (from 30 to 40 of different sizes,) of the common black earthenware of Bengal, and of the usual pattern, were found, and several neatly made small boxes, some of which appeared to have contained articles of clothing, others books or papers ; one appeared to have held a quantity of reddish coloring matter that might have been "Sindoor," and another had been filled with miniature tools and weapons, such as spear and arrowheads, hatchets, hammers and chisels ; the usual eating and cooking vessels were found, and a block upon a stand that had been used for preserving the shape of the turban or head-dress. From all that I can learn amongst Coolies and others who have been employed in digging out those graves, it appears that (Rajahs excepted) any variation from the tomb I have attempted to describe, has been owing to the rank in life or means of the party, causing them to be larger or smaller, stronger or slighter, accordingly ; but all on nearly the same principle, and the articles buried with them appear to have been invariably the personal ornaments, eating, drinking and cooking vessels of the deceased.

I have further taken the liberty of enclosing a sketch of what is traditionally said to be the ground-plan of the tomb of the older Ahom Rajahs previous to the reign of Chukunpha, alias Rudra Singh, A. D. 1695 or A. A. 1620. This Rajah is said to have prohibited the burying alive of his queens, guards, attendant slaves, elephant, &c. at his decease, and if this story has any foundation it would cause a material alteration in the size and arrangement of the tombs, as such a number of apartments would not then be required.

The rough plan of the Rajah's tomb I drew from information given me by an old Ahom villager who was pointed out to me as a man well acquainted with their old customs and traditions ; he drew the plan with a stick on the ground, and named each apartment, and I must say that he, at least, appeared firmly to believe in the truth of what he was describing to me. Some part of his story has since been corroborated

by coolies who have been in those places, so far as separate apartments, remains of musical instruments, arms, &c. having been found in them, but from the way in which those tombs are opened, generally by a narrow shaft from the top, and the hurried way in which they have been explored, the foul air preventing them from being searched far from the opening of the shaft, it is very difficult to gain any correct information regarding the interior. In my rough sketch I have assumed the space occupied by the elephant to be 10'×5', and for the horse 10'×3', with a partition wall of 2 feet, which would give a square apartment of 10'×10' inside, and allowing the outer rooms to have been all of one size, the partition walls 2 feet thick and the outer walls 3', the outside dimensions of the whole building would be a square of 88 feet, and the size of the mound said to contain the tomb of Rajah Gadhadarra Sing at the Chereeai or Seereai Diew, is sufficient to cover a building of much larger dimensions; this however I need scarcely say is at present little better than supposition.

Some system of embalming is said to have been practised for the royal family; but if so, it must have been a very imperfect one, as I have ascertained that nothing more than scraps of bones have ever been found in any of the tombs, although I have met with several men who have asserted that the remains of more than one human being have been found in them.

I trust that you will kindly excuse my having trespassed so very far on your patience with what I am aware must for the most part be already more correctly known to you; but I have been induced to do so in hope that some apparently trifling matter might serve as a clue or connecting link to more important information previously in your possession.

Verification of the Itinerary of HWAN THSANG through Ariana and India, with reference to Major Anderson's hypothesis of its modern compilation. By Capt. ALEX. CUNNINGHAM, Bengal Engineers.

The Itinerary of Hwán Thsáng* is the most valuable document that we possess for the history and geography of Ariana and India

* See Appendix to the FOE-KUE-HI.

prior to the Mahomedan conquests. The minute accuracy of its details and the faithful transcription of the native names of men and places, give it a vast superiority over all the Mussalmán works that I have seen, excepting only that of Abu Rihán. And yet this invaluable account has been impugned by Major Anderson of the Bengal Artillery, who states his conviction that in its present form the nomenclature of Hwán Thsáng cannot claim an antiquity of one hundred years, and he afterwards remarks that "the distances and directions are utterly worthless, being the combined results of misreadings, misunderstandings and guess-work." This is a sweeping condemnation of one of the most accurate of all ancient works, but I am happy to say that I can prove beyond all doubt that Hwán Thsáng is nearly always right in his "distances and directions," and that the Major is generally wrong in his conclusions, they being the combined results of *his own* "misreadings, misunderstandings and guess work."

In the first place, Major Anderson has used the wrong key, and he has consequently failed in unlocking the treasure of Hwán Thsáng's Itinerary. Having fallen upon the word CHI-NA-LO-CHE-FE-LO, which Hwán Thsáng says was the name given to the peaches introduced into the Panjáb from China, the Major's Persian reading immediately suggested that it was derived from the Persian term *shuftálú* (a peach), with the name of China prefixed to designate the country from whence the fruit had been imported. But a *partial* similarity of sound cannot be admitted as a proof of identity, when we have the direct testimony of Hwán Thsáng himself that the name bore a very different meaning. *Chini-shuftálú* means simply "China peaches," whereas the meaning of the original name was "son of the king of China." These translations, added to the transcriptions, enable us to identify the names in Hwán Thsáng's Itinerary beyond all possibility of doubt. Thus CHI-NA-LO-CHE-FE-TA-LO, is only a transcript in Chinese syllables of *China-raja-putra*, "sons of the China Raja." The Chinese alphabet possesses no R, and consequently this letter, as in the present instance, is always replaced by L. I have stated that *Chini-shuftálú* bears only a *partial* similarity to Hwán Thsáng's name: for it will be remarked that the third syllable of the original is altogether omitted in the Major's proposed reading; whereas my rendering of the term gives an

equivalent for each syllable, and at the same time possesses the exact meaning attributed to the appellation by Hwán Thsáng.

Having thus started with the erroneous idea that all the names in Hwán Thsáng's itinerary could be identified by rendering them into Persian and Arabic characters, the Major proceeds to an examination of those mentioned in Northern India and Afghanistan : and believing in the fancied identification of KELU-SI-MIN-KIAN with *Kilah-semangán*, of THSE-KIA, with *Shikárpur*, of Po-fa-to, with *Bhawálpur*, of U-TO-KIA-HAN-CHA with *Attok*, and of TU-MAN with *Hazrat-Imam*, he comes to the conclusion that the work of Hwán Thsáng is of an age posterior to the Moslem invasion of Afghanistan. I will now examine these identifications in detail ; merely premising that, by the same style of reasoning, we may bring down the date of the composition of one part of the Bible to the reign of Queen Elizabeth, because Satan is therein named *Abaddon*, which in the English tongue is an appropriate name for the Devil.*

1st. KELU-SI-MIN-KIAN.—Hwán Thsáng particularly specifies that this place was to the *south* of Fo-kia-lang, or *Baghalán*. Now Semengán was the ancient name of Heibuk, which lies to the North of West from Baghalán, instead of to the South. Of course Major Anderson will say that this is one of Hwán Thsáng's *misdirections*, but I will hereafter show from numerous instances that it is the Major himself who is wrong in his directions ; he having been led astray by the ignis-fatuus of Arabic and Persian. Now his identification of KE-LU-SI-MIN-KIAN, with *Semengán*, rests only on similarity of sound, for he had not proved that Semengán was ever called *Kilah* Semengán, which is a very necessary desideratum before we can admit the identity of the

* In like manner we might bring down the date of Pomponius Mela to the period of British supremacy in India, as amongst the ugly Scythian tribes, he mentions the Riphaces (*Wry-faces*), a name which could only have been derived from us Britishers. An amusing squib might be written in this style against *all* the ancient geographers ; more especially if it was combined with Mr. Vigne's ingenious system of etymologies. According to him, Hem-babs, the Tibetan name of Drás, is derived from *Hima* (snow, in *Sanskrit*), and *Bab* (a pass, in *Arabic*.) In humble imitation of this style I would suggest the possible derivation of the name of London, or Londinium, from *Lon* (salt, in *Sanskrit*) and *Donna* (a lady, in *Spanish*.) From this natural combination, we find that London means "the place of the salt lady," in which we have perhaps an allusion to Lot's wife. Mr. Thornton in his *Gazetteer* innocently quotes several of Vigne's etymologies as if they were correct.

two places. So far from its being a fort, we know from Edrisi that it was only a good sized town with "mud walls" (*murs en terre*). It could not therefore have been called *Kilah Semengán*; and the consequent deduction that the Chinese syllables *Kelu* represent the Arabic word *Kilah* (fort) must be abandoned.

2nd. THSE-KIA. Major Anderson identifies this place with *Shikápur*, but Hwán Thsáng's distances and directions give it a very different position. On the west was the river SIN-TU, the *Sindhu* or *Indus*; and on the east was the river PI-PO-CHE, the *Pipusa* or *Byds*. As there is no river to the eastward of the Indus at Shikápur, the Major has prudently passed over the PI-PO-CHE in silence. But Hwán Thsáng adds another important particular regarding the position of THSE-KIA; namely, that at 11 or 10 li (about $2\frac{1}{2}$ miles) to the South-West of it stood the ancient town of CHE KO-LO, with a *stupa* or *tope* which had been built by Asoka. This is no doubt the *Sákala* of the Mahabhárat, and the *Sungala* of Arrian and Q. Curtius. Its position to the Westward of the Byás agrees precisely with that assigned to the others; and the fact that Asoka built a Stupa there, proves that it was a place of consequence within 50 years of Alexander's death. And now for the first proof of the accuracy of Hwán Thsáng's distances and directions. Hwán Thsáng states that to the Eastward of THSE-KIA at 500 *li* (about 83 miles) stood the monastery of THA-MO-SU-FA-NA, (forêt obscure) and at 140, or 150 *li* (24 or 25 miles) to the North-Eastward from the monastery, was the town of CHE-LAN-THA-LO, or Jalandhara. The monastery must therefore have been near the present Dakhani Serai, on the Káli-Véhi river, and THSE-KIA, and CHE-KO-LO must have been in the neighborhood of Lahore and Amritsar. Now from Dakhani Serai and Sultánpur, the whole of the Western *Doab-i-Jalandhara-pita* is covered with a thick jungle, from which the monastery no doubt took its name of THA-MO-SEE-FA-NA, or "forêt obscure," from तमस् *tamas*, darkness, and वन् *vana*, a jangal. The actual position of CHE-KO-LO, *Ságala* or *Sangala*, I cannot at present determine, but we have no less than three distinct authorities, all of whom agree in placing it to the westward of the Byás, and on or near the high road leading across the Panjáb.

But the position of this place furnishes a second proof of the accuracy

ey of Hwán Thsáng's distances and directions, and the consequent inaccuracy of the Major's identifications. The Chinese pilgrim states that to the South-Westward of KIA-SHE-MI-LO, or *Kashmir*, and across the mountains at 700 *li* (about 117 miles) was PAN-NU-CHA, which all the continental savans have identified with the Panjáb, in spite of the assigned distance and direction. Major Anderson does the same, and remarks that the mention made by Hwán Thsáng that PAN-NU-CHA, was a dependency of Kashmir would, if the time could be ascertained, give a clue to the period when the work was composed. But PAN-NU-CHA is certainly *Panuch* or *Punach*, the *Punch* of the maps, which was always a dependency of Kashmir during the Hindu rule. Hwán Thsáng's distance and direction are therefore again correct. Hwán Thsáng further states that to the South-Eastward of PAN-NU-CHA, at 400 *li* (about 66 miles) was KO-LO-CHE-PU-LO, and at 700 *li* (about 117 miles) more to the South-Eastward, was THSE-KIA; or in other words, that THSE-KIA was situated about 183 miles to the south-eastward of *Punach*. This brings us again to the neighborhood of Lahore and Amritsar, the very position already obtained by working Westward from Jalandhara. As *Amritsar* was originally called *Chek*, it seems probable that the holy city of the Sikhs, stands in the actual position of the *Sikala* of the Mahabharata, and the *Sangala* of Arrian.

These detailed distances and directions, from two such well ascertained places as Kashmir and Jalandhara, fully establish the accuracy of Hwán Thsáng's Itinerary in this part, and the incorrectness of Major Anderson's identification of THSE-KIA with *Shikárpur*; more particularly as Shikárpur is to the *west* of India, and not to the *north*, as THSE-KIA is stated to be by Hwán Thsáng.

3rd. PO-FA-TO. This is placed by Hwán Thsang at 700 *li* (about 117 miles) to the North-Eastward of MEII-LO-SAN-PU-LO, or *Mallisthanpura*, the present Multán. Major Anderson identifies PO-FA-TO with *Bahawulpur* to the South-Eastward of Multán, a direction contrary to that indicated by Hwán Thsáng. As the town possessed no less than 4 topes built by Asoka, its antiquity may be placed as high as the period of Alexander. Now the distance and direction bring us to the banks of the Ravee, and to the neighborhood of *Harapa*, an ancient city now in ruins, which both from tradition and position, must have been one of the large fortified towns taken by Alexander. The Major

has been particularly unfortunate in his selection of Bahâwalpur as the representative of Po-fa-to, as that place was founded by Bahâwal Khan within the last century. *Chicha-watni* may perhaps be the actual position of Po-fa-to, as the second and third syllables are identical.

4th. U-TO-KIA-HAN-CHA. The position of this place can be determined very nearly by Hwán Thsáng's distances and directions. From SHANG-MU-KIA-PHU-SA, which appears to have been a holy spot in or near the city of PU-SR-KO-LO-FA-TI (*Pushkulárati* or *Penkelaotis*, the modern *Hashtnagar*) to the South-East was the town of PA-LU-SHA ; to the north-east of which at 50 *li* (upwards of 8 miles) stood the temple of PI-MA, the wife of Iswara (*Bhimá*, one of the many names of Durga). To the south-east of this temple at 150 *li* (25 miles) was the town of U-TG-KIA-HAN-CHA. From these data I have ascertained by measurements on Walker's and Mirza Mogal Beg's maps that the temple of Bhimá must have stood close to the present town of Noshchera, and that U-TO-KIA-HAN-CHA must have been at or near the modern Niláb. Major Anderson identifies the latter with Attok, and points to the identification of PHO-LO-TU-LO with the ruins of *Pertór*, as a simple proof of his correctness. But the ruins of Bithor lie to the *South* of Attok, while PHO-LO-THU-LO was 20 *li* (or 6½ miles) to the *North-West* of U-TO-KIA-HAN-CHA, which I identify with Niláb, between which place and Attok the hills are covered with the ruins of Bithor and Messa Kot. Major Anderson is wrong in disputing Hwán Thsáng's measurement of the Indus at this place. For the accurate pilgrim does not say that the river was *one mile* wide ; but that it *was* from 3 to 4 *li* (as nearly as possible half a mile) in width ; which it actually is in many places in this neighbourhood. The Major may therefore keep his note of admiration for the breadths of rivers recorded by Arrian. The very fact that the *li* of Hwán Thsáng differs so much from the *li* of the present day proves the antiquity of the composition of his work : for there are about 6 of his *li* to the British mile, whilst of the modern *li* there are only 3 to the British mile. This is not a mere assertion, but a point which I have ascertained by Hwán Thsáng's recorded distances between Kashmir and Jalandhar, before alluded to ; and by the recorded distances in the Kabul valley, which I will now mention.

Beyond FAN-YAN-NA, or BAMIAN to the Eastward, and across the snowy mountains, or *Koh-i-Baba*, lies the town of KIA-PI-SHE, which is undoubtedly the *Kapisa* of Ptolemy and the *Capissa* of Pliny. Major Anderson identifies KIA-PI-SHE with Kabul; and thinks that "SI-PI-TO-FA-LA-SSE may be *Estalif*." But Estalif lies to the North of Kabul, whereas SI-PI-TO-FA-LA-SSE was to the South of KIA-PI-SHE. The Major is therefore as unfortunate in his conjectures as in his more elaborate deductions. SI-PI-TO-FA-LA-SSE is an exact transcript syllable for syllable, of the Sanskrit *Sweta-Versha*. Now Ptolemy mentions both *Kapisa* and *Kabura*, and places the former to the Northward of the latter, and in the neighbourhood of *Barborana* or *Parwan*, of *Parsiana* or *Panjshir*, and of *Niphanda* (read *Ophiana*) or *Hupián*. It is highly probable therefore that we may identify it with the present *Kushán*, more particularly as Solinus calls the place *Caphusa*; for the name of Kushan, کوشان, is often written كفسان, Kafshan, in the same way that we have both Afghan and Aghan.

This point being established I will now proceed to examine Hwán Thsáng's "distances and directions." From Kiapishe to the eastward at 600 *li* was LAN-PHO, or *Lamghán* (*Lambatæ* of Ptolemy.) Thence to the South-East at 100 *li* and across a *large river* was NA-KO-LO-HO, or *Nangrihdár*. Major Anderson calls this district *Nang-néhar*, which is only another erroneous fruit of his Persian predilections, that name being the Persian corruption of *Nangrihar*, as the word is spelt in Pushtu works, and which is faithfully preserved in the Chinese transcript. Professor Lassen has identified it with the *Nagara* or *Dionysopolis* of Ptolemy, which was no doubt the same as the *Begrám* near Jalabad, around which several topes still exist as witnesses of Hwán Thsáng's accuracy. Ptolemy's name of *Dionysopolis* was still in use so late as A. D. 1000, for *Dinuz* or *Dinus*, is mentioned by Abu Rihan as lying nearly midway between Kabul and Peshawur. Now, from KIA-PI-SHE to NA-KO-LO-HO being 700 *li* or 233 miles by Major Anderson's estimate of the *li*, it follows that if he is correct in his identification of the former with Kabul, the latter must be situated to the eastward of Peshawur; but as he identifies NA-KO-LO-HO with *Nangrihar*, it is clear that his estimate of the *li* must be wrong. According to my estimate of 6 *li* to the British mile the distance will be 117 miles; which is only a few miles more than the distance measured upon Walk-

er's large map. Again, from NA-KO-LO-HO to KIAN-TO-LO, or *Gandhāra*, and its capital, PU-LU-SHA-PU-LO, the distance is said to be 500 *li*, which according to Major Anderson's estimate, would place the latter somewhere to the eastward of the Jehlam. By my estimate the distance is upwards of 83 miles, which is somewhat short of the distance measured by the perambulator. But the total distance by my estimate is exactly 200 British miles, which agrees nearly with the measured distance of Alexander's surveyors between *Alexandria Opiane* (Hupian) and *Peukeiaotis* (Hashtnagar) which was 227 Roman miles, or $207\frac{1}{4}$ British miles. From these statements it is clear that it is not Hwán Thsáng's distances that are wrong, but Major Anderson's estimate of those distances.

5th. Iu-man. This Major Anderson identifies with *Hazrat Imam*;—but Hwán Thsáng's statements point to a different place:—for *Hazrat Imám* lies to the south of the Oxus, whilst all the place, to the East and West of JUMAN lie to the north of the Oxus. Besides which the itinerary of the Southern bank from AN-TI...-LO-FO or *Anderib* to SHE-KHI-NI, or *Shakhuan*, is detailed in another place. According to Hwán Thsáng Iu-man was situated between TAN-MI, or *Termed*, to the North of the Oxus, and Ko-tu-lo, or *Khatlán*, a district likewise to the North of the river. Now in this very position we have the *Nhomán* and *Nomín* of Ibn Haukal, the *Sumán* of Edrisi and the *Shumán* of Abulfeda. But the itinerary of Edrisi agrees exactly with that of Hwán Thsáng. To the eastward of TAN-NI, or *Termed*, was CHI-AO-YAN-NA or *Chaganian*; to the east of which again was HU-LU-MO, the *Hamúrán* of Idrisi, situated at 30 miles from Chaganian. Then to the east of HU-LU-MO was Iu-man, the *Sunmán* of Edrisi, 39 miles from Hamurát. Beyond Iu-man was KIU-HO-YAN-NA, the *Andián* of Edrisi, and the *Alubán* of Ibn Haukal. Then to the eastward was Hu-sha, the *Waksh* or *Washgerd* of the two Musalmán geographers; beyond which again was Ko-tu-lo, or *Khutlan*, a district on the northern bank of the Oxus. This well known place the Major identifies with *Kator* to the south of the Hindu Kush. From these distinct details it is certain that Iu-man cannot be identified with Hazrat Imám.

I have now examined one by one the chief positions on which Major Anderson relied for the proofs of the correctness of his system of iden-

tification. As not one of them has stood the test of a rigid examination I consider it clear that the Major's system must be wrong: in further proof of which I will examine a few more of his geographical identifications before proceeding to the historical part of the enquiry.

P. 1189, "KIU-MI-THO."—"Kunduz I suspect." Hwán Thsáng has just before been detailing the itinerary of the *northern* bank of the Oxus from Termed *eastwards*: and beyond Ko-tu-lo or *Khutlán*, (mentioned above) he placed the mountains of Tsung-Ling and Ku-mi-tho, which must therefore be to the eastward of *Khutlán* near the source of the Oxus; in which position we find the *Komedoe Montes* of Ptolemy answering to the Tsung-Ling, and the *Vallis Komedorum* answering to the district of KIU-MI-THO, Hwán Thsáng is therefore right again.

P. 1189.—"CHI-KHI-NI, Cherkes-Circassia," *Circassia!* To justify this seven-leagued saltation the Major states that he has no doubt "a leaf has here taken its wrong place." I feel bold enough to express my opinion that the leaf is certainly in its right place, and that CHI-KHI-NI is as certainly in the very position indicated by Hwán Thsáng. The origin of many of the Major's most erroneous conclusions may be noticed in his attempted identifications of this word, in which he evidently reads the French *ch* as an English hard *ch*, instead of as the English *sh*. After correcting this curious "misreading" we have, according to Hwán Thsáng, the river FA-TSU or Oxus to the southwest of KIU-MI-THO, and the mountains of *Tsung Ling*; and to the south of the Oxus, we have SHI-KHI-NI or *Shakhnán*, the *Lakinah* of Ibn Haukal, and the *Sakiná* of Edrisi: the district on the Shakh-Dara, one of the head waters of the Oxus.

To the south of SHI-KHI-NI, on crossing the Oxus, we come to THA-MO-SI-THIEI-TI, or HU-MI, of which the inhabitants had green eyes. This district Major Anderson identifies with *Daghestan* on the Caspian: but from the position assigned to it by Hwán Thsáng there can be no doubt that it is the present *Wákhán*. The dimensions given to it agree very well with those of the narrow valley of the upper Oxus. HU-MI was from 1500 to 1600 *li* (250 to 266 miles) from east to west; and only 4 or 5 *li* (rather more than half a mile) in width, from north to south. Now from the Sir-i-kol lake to the junction of the *Shakh-dara*, the Oxus is 170 miles in length, measured direct by a pair

of compasses on Wood's map, to which must be added one half more for the windings of the stream, making a total length of 255 miles. From Ish-kashn to Kundut the valley of Wakhan, according to Wood, is from "a few hundred yards to a mile in width."—The average width is therefore somewhat more than half a mile, as accurately stated by Hwáng Thsang. This is one more proof that the distances and directions of the Chinese pilgrim are correct.

But there is another interesting point mentioned by Hwán Thsáng connected with this identification of Hu-mi with Wakhan that in my opinion adds the last link to the chain of evidence in favor of the correctness of my identification. Hwáng Thsang says that Hu-mi was one of the ancient districts of the Tu-ho-lo, or Tochari. Now one of the five tribes of the Tochari were named Hieu-mi, and their chief town was called Ho-mi. From them I believe that the Oxus received its name of Amú. This was no insignificant clan, but a mighty tribe, whose king, Kadphises Hoi no (OOHMO), judging from the numbers of his coins still existing, must have ruled over Kabul, and the Panjab for a long time.

The mention of green eyes points to a mountainous country, and not to the low banks of the Caspian. For it is a well known fact that in lofty mountain-valleys the inhabitants generally have blue or grey eyes, often inclining to green, as is likewise the case with the same colored eyes in Europe.

P. 1197.—“Ou-la-chi may be Uch.” This is another instance of the French *ch* being misread as the hard English *ch*. U-la-shi is no doubt the *Urasa* district of the Kashmirian history, the *Urasa regio* of Ptolemy, and the *Rash* of the present day, for the district of *Rash* lies just to the westward of Mozafarabad, and to the north-east of Kashmir; agreeing with the direction indicated by Hwán Thsáng.

P. 1199.—“Che-to-thou-lo,—Khoozdar.” This is a third instance of the misreading of the French *ch*, and distances and directions are again mistaken. According to Hwán Thsáng to the north-east of Che-lan-tha-lo, or Jálendhara, and across precipitous mountains at 700 *li* (about 117 miles) was Khiu-lu-to, the boundary of India on the north. Both distance and direction point to the district of *Kulu*, which as Hwán Thsáng correctly states, is “surrounded by mountains, and close to the snowy mountains.” Major Anderson iden-

tifies KHIU-LU-TO with *Kelát-i-Ghilzi*. Now from KHIU-LU-TO to the south, at 800 *li* (about 133 miles) across high mountains and a large river, was SHE-TO-THU-LO, bounded to the west by a great river. This name, SHE-TO-THU-LO is an exact transcript of the Sanskrit *Satadru*, the *Zadadrus* of Ptolemy, and the *Hesudrus* of Pliny, now called *Satrudr* or *Satlaj*. The other large river crossed on the road from *Kulu* is of course the *Vipdsā* or *Byás*.

These two identifications of KHIU-LU-TO and SHE-TO-THU-LO with *Kulu* and *Satadru*, are I think, conclusive of Hwán Thsáng's accuracy both in distances and directions, and of the erroneousness of the Major's system of identification founded upon Persian readings and etymologies. My identifications prove that Hwán Thsáng derived his names from Sanskrit originals; witness the rivers PI-PO-CHE, or *Viplsā*, SHE-TO-THU-LO, or *Satadru*, SU-PHO-FA-SU-TO, or *Subhavastu*, with the towns PU-SE-KO-LA-FA-TI, or *Pushkhalvati*, SATHANI-SHE-FA-LO, or *Sthaneśwāra*, and numerous others, all of which show that Hwán Thsáng could not have copied his names from the misspelt spoken names of Mahomedan authors. As Major Anderson has stated his conviction that Hwán Thsáng has derived his information from "Arabic and Persian geographical publications," it behoves him to point out the Musalmán geographer from whom the Chinese author has copied. If such a work really exists it will be invaluable. I will now proceed to an examination of some historical points mentioned by Hwáng Thsáng for the establishment of the perfect correctness of the date (600 to 650 A. D.) claimed for him by Chinese authors.

1st. In his mention of the kingdom of SIN-TU or Sindh, Hwán Thsáng states that the king was of the race of CHOU-TO-LO (or in English characters, SHU-TO-LO) an exact transcript of the Sanskrit *Sudra*, one of the four well known castes of Hindus. Major Anderson, using the same mispronunciation of the French *ch* for a fourth time, identifies the CHOU-TO-LO with "Chator, a celebrated tribe of Rajputs." *Chitor* or *Chitrávara*, is the name of a celebrated fortress, as its meaning implies, and not that of a tribe. The Rajputs of Chitor are now called *Sisodia*, but in Hwán Thsáng's time they were known under the names of *Gráhilot*.

Now the period at which *Sudras* reigned over Sindh must be the date of Hwán Thsáng's visit. In the *Chach-Námeh*, or Persian history of

Sind, we find that Mohammed bin Kásim conquered that country from Raja Dáhir in the year A. D. 711. As Dáhir reigned 33 years, and his father Chach reigned 40 years, we obtain A. D. 638 as the date of Chach's accession. Now as Chach and Dáhir were Brahmins, and their successors were Mahomedans it is clear that the Sudras must have reigned prior to A. D. 638; which agrees precisely with the period assigned to Hwán Thsáng's travels from A. D. 629 to 646. I cannot positively assert that Chach's predecessor was a *Nudra*; but it is certain that he was not a *Brahman*, for the Rāja of Chitor addressing Chach says "you are a *Brahman*; the affairs of Government cannot be carried on by you;" thereby intimating that his predecessor was not a Brahman.

2nd. At 1000 / (about 166 miles) to the north-east of U CHE-YANNA or *Ujain* was the kingdom of CHI-CHI-TO of which the ruler was a Brahman. Now from Abu Rihán's description of *Jajácati* (read *Chachávati*) of which the capital city was named *Kujuráhah*, there can be no doubt that the place indicated was the principality afterwards held by the Chandel Rajputs, *Kujuráha* still exists; and from the inscriptions yet extant, as well as from the genealogy preserved by the bard *Chand* in his *Chand Rás*, we know that the Chandel Rajputs held this district from about A. D. 700 down to the period of the Mahomedan conquest. The time at which a Brahman reigned there, and consequent by the date of Hwáng Thsáng's visit must therefore be anterior to the accession of the Chandel Rajputs, or prior to A. D. 700 which agrees with the time assigned to Hwán Thsáng's travels.

3rd. In his mention of MA-KIEI-THO or *Magadha*, Hwáng Thsáng gives the name of five kings who reigned there previous to his visit. Their names are,

SO-KIA-LO-A-YI-TO.	or <i>Sunkaraditya</i> .
FO-THO-KIU-TO.	<i>Budhagupta</i> .
THA-KA-TA-KIU TO.	<i>Takatagupta</i> .
PHO-LO-A-YE-TO.	<i>Baladitya</i> .
FA-CHE-LO.	<i>Vajra</i> .

Of the second, fourth, and fifth of those Princes there are coins still existing to testify to the truth of the pilgrim's narration. But we have yet more explicit evidence of his accuracy in the date of *Budha-gupta's* inscription on the Eran Pillar. This date is 165 of the Gupta era

which as we learn from Abu Rihán commenced in A. D. 319. The date on the pillar is therefore equivalent to A. D. 484. Supposing that *Budha-gupta* reigned until A. D. 500, and that the three following princes occupied the throne during the 6th century we have the date of A. D. 600 as the earliest limit of the period of Hwán Thsáng's visit.

4th. The king of *Pho-li-ye-tha-lo* was of the race of *Fei-she* or *Vaisya*. *Pho-li-ye-tha-lo* is a literal transcript of the Sanskrit *Vrihadhara*, the "much-containing," a synonyme of Indra, and the recorded bearing and distance of 83 miles to the westward of *Mo-thu-lo* or *Mathura* point to *Indra-prastha* or Delhi, as the place visited by Hwán Thsáng. Now we know from Abul Fazl's lists that prior to the conquest of Shaháb-ad-din in A. D. 1188, the throne had been occupied for 83 years by 7 *Chohán* kings, who reigned 83 years and before them by 20 *Tuar* kings who reigned 437 years. From these data, we have A. D. 1188—83—437—668 A. D. the latest date at which a *Vaisya* prince could have reigned at Delhi.

I have now shown from four independent historical statements made by Hwán Thsáng that the period of his visit from A. D. 600 to 668 corresponds precisely with the date assigned by the Chinese authorities, namely the first half of the 7th century. This date is moreover fully corroborated by other internal evidence of which the principal points are ; 1st, the total silence of the pilgrim regarding the Arabs and their conquests ; 2nd, the mention that the king of *Foe-li-shi-sa-tang-na* or *Parashasthan*, (the present *Panjhir* or *Panjshir*) was of the race of *Thu-kiueï* or *Turk*; therefore prior to A. D. 900, the period of the usurpation of the Brahman *Kallar*, whose descendants reigned over the Kabul valley until Mahmud Ghaznavi's conquests. This is distinctly proved by Abu Rihán. 3rd, That all the districts along the Oxus were in the possession of the *Tu-ho-lo* or *Tochari*: therefore prior to the Arab conquests in the beginning of the 8th century.

In conclusion I would ask Major Anderson to state in what Mahomedan author Hwán Thsáng could have found the *Sanskrit* names of kings and countries already noticed. I will answer the question myself. "In none :" for, to quote the words of Ibn Haukal regarding *Hind*, (India) as the greater portion of the country belonged to Kafirs and Idolaters, "a minute description of it would be unnecessary and unprofitable."

*Correspondence regarding the Coal Beds in the Namsang Nago Hills.
Communicated by Capt. T. E. ROGERS, Superintendent of Marine.*

No. 191 of 1848.

*To Capt. T. E. ROGERS, I. N. Superintendent of Marine,
Fort William..*

Dated Gowahatty the 13th April, 1848.

SIR,—I have the honor to submit a letter No. 175 of the 9th ultimo from Mr. J. Thornton, sub-assistant, accompanied by a map prepared by that gentleman reporting his visit to the coal beds on the banks of the Dikno, which were discovered, and partially worked at the expense of Government by the late Mr. Sanders.

2. In laying this report before you I have no other immediate object than to place at your disposal all the information we may obtain from time to time relative to the coal formations of this province, should the Government at any time be induced to work any of the beds on their own account.

3. The quality of this coal you will find by reference to the proceedings of the coal committee has already been favorably noticed, and I believe it is in all respects equal to the Jeypoor coal, and much more favorably situated for being worked and transported downwards whilst there is reason to suppose it exists in much more extensive beds than at Jaipore.

4. It might be desirable that this and other similar reports should be published for general information, and perhaps the Asiatic Society would give them publicity as information connected with economic museum of Geology forming by that Society.

I have, &c.

(Signed) F. JENKINS,
Agent Governor General.

No. 175.

*To Major F. JENKINS, Governor General's Agent N. E. F.
Gowahatty.*

Seeb-Saugor, 9th March, 1848.

SIR,—I have the honor to state that I have returned from an inspection of the coal beds in the Namsang Nago hills, having proceeded

thither with a view of reporting on the practicability of supplying coal from thence for the use of the Government Steamers coming monthly to Assam.

2. I am having a survey made of the road or path from Nazeerah to the coal beds from which a map will be drawn up and furnished to you, I trust in a fortnight. I beg to note in the margin, the distances

From Nazeerah to the foot of the hill,	$10\frac{1}{2}$ miles.
From thence to coal dépôt on the Dikhoo river,	$3\frac{1}{2}$ do.
From thence to coal beds,.....	$23\frac{3}{4}$ do.
From Nazeerah to coal beds,.....	$16\frac{1}{2}$ do.

in detail from Nazeerah to the coal beds; the first distance is along a broad road which has been long neglected but by repairs may be made a very good road. The second distance is a foot-path over low hills and may be made a tolerably good road at a moderate expense.

The last portion of $2\frac{3}{4}$ miles is the most difficult part of the whole, being over a hill about 1800 feet high with two or three steep ascents. A coolie cannot take more than two light loads from the coal beds to the coal dépôt in the course of a day.

3. Respecting the transport of the coal by water, I beg to state that the difficulty lies only near and under the hills where the rapids are numerous. But as boats of the largest size during the rainy season can proceed up the Dikhoo to the first rapid and as canoes of 15 or 20 maunds in the dry season, and of 100 maunds in the rainy season, can be taken over the rapids to the coal dépôt, I see nothing to prevent the conveyance of coal by water to Gowahatty. I came down in a canoe of 20 maunds over most of the rapids without any danger or difficulty. I did not see all the rapids, but those that I came over appeared to consist entirely of loose stone of various sizes; by removing which, or turning them into weirs, the navigation of the river would be considerably improved.

4. The bed of the coal that is now being worked by the Contractor's men, crops out on the brow of a hill about 1400 feet high, and is situated on the right side of the Namseesoo valley, down which flows a mountain torrent called the Namseesoo Nuddee. It is considerably elevated above the bed of the torrent. The thickness of the coal-bed strata is about 10 feet, of which the pure coal bed is from 3 to 4 feet. The remainder, consisting of black powder and soil interspersed with lumps of iron pyrites—the dip of the bed is about 36° and the direction 40 S. W. and N. E.



MAP of the ROAD
from Nazeerah to the Coal Beds
in the
NAMSANG NAGAH HILLS

Scale 1 Mile to the Inch.

From pieces of coal and traces observed of excavation made by Mr. Sanders in 1842, I am of opinion that there are other beds of coal at various depths under the one at present exposed to view, which is at the point of now being worked, about 10 feet below the surface of the soil. With a dip of 36° it must increase in depth rapidly, but this renders it not improbable that coal may be found at a lower elevation in some other part of the valley.

5. The present Contractor, Muneeram Dewan, has never visited the coal beds, and has shown their capacity by returning 200 rupees of the advance he received. The difficulty of supplying coal from the Namsang hills is great, but not in my opinion insurmountable. A respectable man, Roodram Hensoa Boowah, proceeded with me to the coal beds, and after due examination he is willing to contract for the supply of coal at Gowahatty at the rate of 8 annas per maund. I would therefore beg the favor of your permitting an advance to be made to him of Co.'s Rs. 250 on proper security, and sanctioning an outlay of Co.'s Rs. 250 for the clearance of the road from the foot of the hills to the coal beds, a distance of 6½ miles. I am in hopes that by opening the road and making a proper search in the several mountain streams of the low hills, other beds of coal may be discovered more accessible than those at present under notice.

6. I have not forwarded any specimen of the coal because the present contractor has furnished several maunds of it to the Steam Agent at Gowahatty. Besides this, the Coal Committee know the quality of the coal from Mr. Sanders' reports and specimens. Mr. Mornay, Superintendent of Assam Company, accompanied me to the coal beds. He has been employed for some time at the Bengal Collieries and his opinion is that the Namsang coal is far superior to any obtained from the Damoodah and Adji coal mines.

I have, &c.

(Signed) JOHN THORNTON,
Sub-Assistant Commissioner in charge.

Seeb-Saugor Commissioner's Office, }
the 9th March, 1848. }

Sanskrit Inscription from Behar, with a translation by Dr. BALLANTYNE and remarks by Capt. M. KITTOE.

विहारसे दक्षिनपूर्व पांच कोस पर सुकामगुसरानामे एक
बौद्धके पुराने मन्दिरपर यह खुदा छ़या था।

- १ श्रीमानसौ जयति सत्त्वितप्रवृत्तसन्मानसाधिगततत्वनमोमुनीन्द्रः॥
लोकान्दुरितनक्षिदुरासदान्तः संसारसागरसमुच्चरणेकसेतुः ॥
- २ अस्यामहूर्वोवभूबुर्बलास्सम्भूयहर्तुमनः का लज्जा यदि केवलो
न वलवानस्त्रिलोकप्रभौः ॥
- ३ इत्यालोचयतेवमानसभुकायो दूरतो बर्जितःश्रीमान्विश्वमधेष्ठ-
मेतदबलादेधौ सवचासनः
- ४ अस्युत्तरापथविभूषणमूतमूमिर्देशोत्तमोनगरहारहतिप्रतीतः ॥
- ५ तत्त्विजातिरुदितोदितवङ्ग जन्मानाम्भेन्दुगुप्तइति राजसखोवभूव ॥
रज्ञोक्यादिजवरस्सगुणो ग्रहिण्यायुक्तोरराजकलयामलयाजयेन्दुः
लोकःपतिव्रतक्यापरिभावनासुसंकीर्तनं प्रथममेव करोति यस्याः ॥
- ६ ताभ्यामजायतसुतः सुतरां विवेकी योवाल रव कलितः परलोक-
बुद्धा ॥
- ७ सर्वोपभोगसुभगेयिगृहे विरक्तः प्रवच्ययासुगतशासनमध्यपेतुम् ॥
वेदानधीत्र सकलान् छतशास्त्रचित्तः श्रीमत्तनिष्ठमुपगम्यमहा-
विहारां ॥
- ८ आचार्यवर्यमथसुप्रश्नमप्रश्न्यम् सर्वज्ञशान्तिमनुगम्यतपञ्चार ॥
- ९ सोयंविशुद्धगुणसम्मूतमूरिकोर्त्तेःशिष्योनुरूपगुणशोलयश्रोतुभिरामः
वाजेन्दुवल्लिकलङ्घविमुक्तकान्तिर्वन्यःसदामुनिजनैरपि वोरदेवः ॥
- १० वज्ञासनम्बन्दितुमेकदाथश्रीममहावोधिमुपागतोऽसौ इव्युन्ततोऽ-

- ११ गात्महेशभिक्षुन् श्रीमद्यशोवर्मपुरं विहारं । तिष्ठतये हस्तु चिरं
प्रतिपत्तिसारः श्रीदेवपालभुवनाधिपतिव्यपूजाः ॥
- प्राप्तप्रभः प्रतिदिनोदयपूरिताशः पूषेवदारितमप्रसरोरराज ॥
- १२ भिक्षोरामसनः सुकृद्धुजइव श्रीसत्त्वबोधेनिजो नालन्दापरिपाल
नायनियतस्तक्षास्थितेर्यास्थिलः ॥
- १३ येनैतीष्टुटमिक्षैष्टुट श्रीचैत्रचूडामणी आमण्डतसन्तुतेन-
जगतप्रभेयोर्जर्थमुत्थापितौ ॥
- १४ नालंदयाचपरिपालितये हस्त्वा श्रीमद्विहारपरिहारविभूषिताङ्गा
उद्घासितोऽपिवज्ञकोर्ति बधूपतित्वेयस्ताधुसाधुरिति साधुजनौ
प्रशस्तः ॥
- १५ चिन्ताज्वरं द्वयतार्तजनस्य दृष्ट्याधन्वन्तरेरपिहियेन हतप्रभावः ॥
- १६ यश्वेष्टितार्थपरिपूर्णमनोरथेनलोकेनकल्पतरुत्त्वतयामृष्टोतः ॥
- १७ ते नैतदचक्रतमात्ममनोबज्जैर्वचासनस्य भवनम्भुवनोतमस्य ॥
संज्ञायतेयदभिवोक्ष्यविमानगानाकैलाशमन्दरमहीधरश्वरश्वरा ॥
- १८ सर्वस्योपनयेनसत्त्वं सुहृदमौदापमन्यस्यता समोधौविहितस्युहं
सहगुणैर्विस्फार्हं यीर्यन्तथा अत्रस्येन निजेनिजाविहृष्टहत्पुण्ड्रा-
धिकारेस्थितेयेन स्नेनयश्चोधजेन घटितौवङ्गावुदीचीपथे ॥
- १९ सोपानमार्गमिव मुक्तिपुरस्यकीर्तिमेताभ्युधायकुशलं यदुपात्तमस्मात्
- २० क्षत्वादितः सपितरं गुरुवर्गमस्य समोधिमेतुजनराशिरशेषवर ॥
- २१ यावत्कूर्मोजलधिवलयाम्भूतधाचीविभर्त्तिध्वान्तध्वंसी तपति तपनो-
- २२ यावदेवोयरश्चिः चिमधालोकांशिशिर महसायामवत्स्यावत्ताव-
लीर्तिर्जयतुभुवनेवीरदेवस्य शुभा ॥

Translation.

" Glory to that holy Munindra who has obtained an acquaintance with the truth by directing his excellent understanding to the welfare of all

beings, the sole bridge by which the soul-wearied can cross this world-ocean, the midway of which is hard to pass in consequence of those sharks, our sins ! May that holy one protect this whole world, he who is firmly seated in wisdom, he who was left unassailed by the God of desire, for *Káma**deva*'s reflection was this :—‘ If I am powerless against this Lord of the three worlds, when all my agents united,—(women, odours, the spring time, moonlight, and all other things that incite to love) have failed to attract his thoughts, why need I be ashamed ? ’

“ There is in the northern quarter, placed in the loveliest of lands, the best of places, named *Nagarahára*. There, there was a twice-born man named *Indragupta*, a friend of the king, who had been born in the country called Bengal. That worthiest of the twice-born was inseparably united with his wife *Rajjoka*, as the moon is with its lustrous digits ; and when people spoke of the histories of devoted wives, the first name mentioned was always hers,. To those two there was born a son, most sagacious, who, even whilst he was reckoned a child, in consequence of his desire to know of the other world, abandoned his comfortable home, where every luxury was at his command, in order ascetically to follow the instructions of Buddha.

“ Having perused all the *Vedas* and having pondered the *Sástras*, he went to the holy convent called *Kanishka*, where the best of teachers were to be found, and which was famous for the quietism of its frequenters. There he devoted himself to asceticism.

“ This student became adorned by qualities, practices, and fame like those of his teacher, renowned for purest virtues. *Viradeva* was his name. The sages honored him, for he was pure from stain as the new moon.

“ Once he went to visit the greatest of the *Buddhas* *Vajrásana* (the occupant of the adamantine throne) ; then he went to the city of Behar, the city of king *Yasovarmmá*, to visit the holy mendicants and their disciples. He, the quintessence of truth, having staid long there, received the respectful attentions of the Lord of the land, *Sri Devapála*. Resplendent he shone, daily fulfilling the hopes of men, as the sun, filling the four quarters of the heavens, dispels the darkness.

“ He was the friend of the pious mendicant *Satyabodhi*, intent on keeping the road to salvation ; he was as close a friend to him as his own soul, as his own arm. Practising all the duties of asceticism, he raised,

for the world's benefit, these two gems of tumuli evidently as beautiful as the peak of mount *Indrasaila*. He was lauded by the good with reiterated applauses, as the Lord of fame, though his chief glory was his keeping the true word of salvation ; a path whose glory consists in the abandonment of all worldly pomp and pleasure. By him was the splendour of even *Dhanwantari* (the physician of the Gods) eclipsed, for he soothed by a glance the thought-fever of afflicted mortals. The world, all whose wants and wishes he supplied, took him for the (all-bestowing) *Kalpa* tree. By him was erected this temple of *Vajrásana*, the best in the world, lofty as his own soul, the sight of which put the Gods in doubt whether it were mount *Kailása* ; they beheld by him the every way bountiful, the friend of all that exists, the practiser of asceticism, whose practice thereof was combined with a thirst for knowledge and a perseverance as imitable as his other virtues.

"By him, occupied in his high and holy duties, were built two vaulted edifices in the northern regions, as the pennants of his fame. Having made this fame a staircase (or Jacob's ladder) to the city of salvation, it was his desire that the whole multitude of his ancestors —his father taking the lead—should thus attain the fruits of saving knowledge.

"So long as the tortoise shall support the earth ocean-garlanded, so long as the bright-beamed sun shall shine, dispelling darkness, so long as night shall seem pleasant with the cool moon-beam, so long may the fame of *Váradéva* shine lustrous on the earth!"

Remarks.

This curious, and I think valuable inscription, I discovered partly by chance, for though I had made every enquiry I learnt nothing till I was about leaving the village of Pesserawa, for my onward march, when some children gave information of its having been found in the mound from whence the people were then digging bricks, and which has been the site of a large Bauddha temple of the Tantra period, which the numerous idols, mutilated and entire, clearly show ; there have been more than one temple on this spot, for the mound is extensive. The inscription points to this being the case ; there is no tradition beyond a couplet concerning Durga or Devi, to whom there is a small temple of modern date a little to the west of the mound ; but saving the idol of Durga slaying Mahishásura, the rest are all purely Buddhist collected

from the mound. There is one of Ilá giving birth to Sákya ; the child is jumping from her side whilst she holds the branch of a tree ; heavenly musicians are playing and her attendants are with her. I tried to obtain this, but they would not sell it, though they readily sold the inscription ; however, afterwards, some ignorant Brahmans upbraided the zemindar for so doing. I removed the slab to Behar, where I took perfect fac-similes in triplicate, and returned it to the village, where I had it fixed in a niche in the outer wall of the modern temple above described, having first engraved in English on the margin the date of its being recovered and set up by me for preservation on account of Government. I hoped to inspire confidence by this means and thereby induce people to disclose any other such mounds, of which I have no doubt there must be many where these great ruins exist ; Bargáon, Lettarawa, Yogespúr, &c. &c. &c. It is very difficult to gain any information in Zillah Behar, the people are bearish and ill-disposed in the extreme. I have here traced part of the first line of the inscription to give an idea of the style of writing,* which is a good specimen of an early type of Mithilá Nagrí, that in which most of the inscriptions on the Idols are written, more or less modified ; the letter M, ए, is written ए, which is but a slight remove from ए of the Gupta writings. I attach much weight to these apparently trifling variations, as I feel convinced that they aid materially in deciding the date of sculptures and writings. In the present case for instance, I am inclined to think that Devapála, whose name occurs in Abul Fazl's list, in the copper plate from Monghyr and that from Dinájpúr, as an early sovereign of the Pála dynasty of Goura or Bengal (vide Prinsep's Useful Tables, p. 117) must have reigned in the 9th century of our era the style of writing even in Náráyanpála's time being of a more modern stamp though early dates are found in inscriptions of a like type. The Dinájpúr plate gives 1027 S. as the date of Vigrahapála ; Deopál or Devapala is 8th in succession before him ; allowing 25 years as an average for each reign, we have 7 intervening, or $25 \times 7 = 175$ —1027; leaving 852 Sumbut for the approximate period of Devapála's reign ; consequently of our inscription, albeit Abul Fazl gives 1050 S. as the date, there are other reasons for supposing him to be in error, the inscriptions found by me

* We have thought it worth while lithographing a fac simile of this line in Plate XXXIV.—Eds.

at Gaya by the Sudra family date in the reigns of Nayapála and Vigrahapála the style of writing in them is far more refined, indeed it is the most elegant of any Indian writing. More than one of Náráyana-pálas reign are clearly of a later type than the one under review. The fine inscription at Uffsur is an intermediate type again between this and the Gupta of the coins and pillars. I shall be excused for this digression when it is considered how desirable it is to ascertain the date of an inscription bearing so much on several points of historical interest and particularly on the subject of Buddhism. We clearly see that it must have been revived after the persecution of Sankara Acharya and in a degenerate form; we learn that the author was a twice-born man (द्विजराज् Dwijraj) par excellence a Brahman, though the term is applicable to other classes, he was learned in the Vedas and Sastras, showing that both were studied at the time by Buddhists, that the deities of the Hindus were acknowledged, for the last verse invoking the blessing of preservation says "as long as the earth shall remain firm on the back of Kurma the Tortoise," also the passage concerning the temptations of Káma Deva. We find mention made of the famous Vihára founded by Kanishka, who is no doubt the same who as king of Kashmir re-established Buddhism, it is not clear from the text whether Vira Deva the hero of the inscription studied under Kanishka, or merely at his Vihara; if the former it would show a monstrous anachronism in the Raja Tarin-gini or history of Cashmir, a point by no means to be wondered at. I would invite the particular attention of Sanscrit scholars to the passage in the text for the pundits first read it so. Dr. Ballantyne (Principal of Benares College) has kindly taken much pains to arrive at a correct meaning, for both my own pundit a young man educated in the Benares College, Hunumán Dyal, and Híránand the talented teacher in the Sanscrit Pathsála, as well as others, have been at a loss on account of terms the meaning which they were unacquainted with. In the sentence श्रीमधसोवर्यपुर्विहार, or rather Sri Madyaso Varmma puram Viharum." The one reads it "Dharma Puram," or "city of righteousness Behar." The other the "town of the great Yasovarmá," though the sense scarcely admits of this last reading, yet the letter is clearly व and not व. The term Acharya Varya it is written आचार्यवर्य instead of आचार्यवर्य. The term implying I believe "religious instructor" occurs in Fa Hian. The term "Nálandá," नालङ्गदा (नालङ्गदा) Hírán and says is to be found in the Vocabulary

of Jain sentences, meaning the cross-legged position of absorptive contemplation of the Buddhas, the word could not be found in any dictionary. Be the date the 9th or the 10th century, we have here clear proof that the Buddhist faith flourished in India (all the land) at that period, that it did so even much later, is proved by the numerous short inscriptions on the images and Chaityas abounding in the district ; and even at Sarnâth near Benares. I have on former occasions noticed the existence of the Linga amongst Buddhist fragments. The figure of Surya, and Mahesh and of Vishnu as Gadâdhar, and Varâha are of equally common occurrence ; there are other idols of the Surrawuc Jains and of the Sheshanag type all jumbled together in this district, and particularly one of Siva with a Buddha on his forehead, also female figures with the same, and Buddhas with the trisûl, one figure at Bargaon represents a fury dancing on a prostrate Ganesha with an attendant holding a royal umbrella over her head : all belong to one period, ranging as I infer, from the 8th to the 10th century if not later ; the later sculptures are the poorest in execution, and most extravagant in form. I have made a tolerable collection of drawings which are about to be submitted to Government officially as the result of my tour. This season they will no doubt be laid before the Society. I think that a grand collection should be made and published ; but it is a work of labour and care. The collection I have made, and which will be sent to Calcutta, is very good and instructive.

My friend Mr. Laidlay considers that the Nagarahâra mentioned in the inscription as the birth-place of Vira Datta is Jalâlabâd or somewhere in its vicinity. I had imagined it to have been somewhere in the Gorackpur, district as the term northern country is used, but the pundits allow that Uttara Desa implies Cashmîr and Cabul. Maha Bôdh is mentioned as a place to which the scetic proceeded. This is modern Bôdh Gaya still known by that name.

Note on the foregoing by J. W. Laidlay.

I suggested the identification alluded to by Capt. Kittoe, as well on the ground that there is no other celebrated Buddhist locality of the same name in northern India, as from the reference made in the inscription to the neighbouring convent or monastery of Kanishka. Of Nagarahâra, what little we know is derived from the narratives of the Chinese travellers Fa hian and Hiouan thsang, by the former of whom

First line of the Gavarana inscription from Capt. Kilow's facsimile.

॥ श्रीमद्भागवतस्मिन्द्वय
गुरुभ्योवादेत्तद्गुरुभ्योवा॒
प्तः ॥ श्रीमद्भागवतस्मिन्द्वय

it is named *Na kie*, and by the latter *Na ko lo ho*. These are, as pointed out by Lassen, the Chinese transcripts of the Sanscrit word नगरा, *nagara*, a town, which he further identifies with the *Nayapa* of Ptolemy.* It is curious, however, that the redundant syllable *ho* in Hiouan thsang's transcription has escaped the attention of both Lassen and Wilson, and is now explained for the first time by the reading of the name in Capt. Kittoe's inscription, नगरहारा, *Nagarahára*. What the exact import of the suffix हरा may be, I have not been able to ascertain. In Wilson's Dictionary it is stated to mean *taking, conveying*; also a *string of pearls*. In the latter sense it may possibly imply the 'precious or splendid city.'

At a period subsequent to the visit of these pilgrims, a nasal appears to have been introduced into the first syllable; for we find Ma-twan-lin, quoting another Chinese traveller, Kwang yuen, who visited India in 983, spells the name *Nung go lo ho lo*; the most exact transcription (omitting the nasal) which his language could supply of *Nagarahára*. Since then, the word has further degenerated into Nangrihar, or more corruptly, Nangnihar, which, according to Lieut. McGregor (J. A. S. vol. XI. p. 116), signifies in the dialect of the country, the *Nine Rivers*, and is applied to the entire valley of the Cabul river.

The convent or monastery of Kanishka, is no doubt that erected by him at Peshawur (Purushapura), the capital of Gandhara, and described by Fa hian and Hiouan thsang as the most magnificent in all Jambudwípa. Kanishka was the monarch under whose auspices, according to Tibetan authorities, the third revision of the Scriptures took place 400 (or, according to Mongolian Chronology, 300) years after the death of Sákya. It is greatly to be regretted that this important inscription is without a date; for it clearly indicates that at the time of its composition, Buddhism, or at least a Hindu-Buddhic syncretism, flourished and was taught in public institutions in the country immediately west of the Indus. At a much later period Marco Polo speaks of the existence of Buddhist monasteries in Cashmere; and even so late as the reign of Akbar, Abulfazl met with professors of that faith in the same country.

The hill designated Indrasaila in Capt. Kittoe's inscription, is that contiguous to the village of Giriyeck near Behar, in the Chinese transcrip-

* Zur Geschichte, &c. p. 147.

tion of which *Yn tho shi lo gu ho*, (इन्द्रसिला गुहा, *Indrasailaguha*, or the 'rock cave of Indra') the original name may be easily recognised. It is the most easterly of the range of hills in which Rajagriha was situated, and was famous among Buddhists as the spot where Sákyá is fabled to have propounded the greater part of the *Prajná Paramitá*.

With regard to *Nálandá*, which appears to have puzzled the Pandits of Benares, it appears to me to be the name of the famous monastery near Rájagriha frequently mentioned in the *Dul-va*; and on requesting Babu Rájendralal to ascertain if the passage would admit of this interpretation, he writes :—"I have very carefully examined the sloka you allude to, and think नालन्दा is the name of a place. The expressions, नालन्दाप्रिपालनाथ, "for the preservation of Nálandá," and नालन्द्याचप्रिपालकित, "preserved by Nálandá," favour this supposition, and there is nothing against it. But as I have never met with this word in Sanskrita, and have not got a copy of Hemachandra's Dictionary of Baudhāyaṇī terms at hand to refer to, I cannot be very positive. I may add, however, that Pundit Jayanarayana Vidyálankára of the Sanskrita College of Calcutta, is of the same opinion with myself, and believes Nálandá to be the name of a place."

Nálandá was a very famous place in its day, and the frequent scene of Sákyá's disputations. It is the *Na lan tho* of the Chinese, the site of which, however, could hardly be identical with that of Gusserawa, where Capt. Kittoe discovered the inscription.

Before quitting this still unexhausted locality, I may take this occasion of mentioning another identification which cannot fail to interest such as are engaged in the investigation of Buddhist antiquities; I mean that of the Sattapanni cave, the scene of the "first convocation on religion," an ample account of which may be found in Mr. Turnour's extracts from the Pali Buddhistical Annals (J. A. S. vol. VI, p. 510.) and in the third chapter of the Mahawanso. It is there narrated that the convocation in question was held in the 8th year of the reign of Ajátasatru, six months after the death of Buddha, in a magnificent hall in front of the Sattapanni cave, in the *Webharo* mountain,—one of the hills that surround the ancient city of Rajagriha. Fa hian in his account of that city mentions the scene of the first convocation, and the "grot of *Pin pho lo*," or "*Pi pho lo*," lying 300 paces to the west of the pass or valley that leads from the old to the new Rajagriha; a site

easily recognised from the marked and unchanging features of the locality. None of the learned French commentators on Fa hian has attempted any restoration of *Pi pho lo*; but in connection with the preceding tradition, it is obviously the Chinese transcript of the Pali *Webharo*, or of its Sanscrit equivalent. Now if we turn to Capt. Kittoe's interesting paper in the Journal for September 1847, we shall find in the Sketch Map at foot of Plate XLII., the Son Bundar cave set down in the *Baibhar* hill in the precise position indicated by Fa hian. The cave itself is thus described by Capt. Kittoe: "To the left or west side of the pass is a chamber called Sone Bundar, of precisely the same shape as those of Burabur. There are sockets to admit of timber roofing on the exterior of the cave, and *there have been buildings extending to some distance in front*: it would be interesting to clear the rubbish here. There are several short inscriptions, and some of the shell shape; one has some resemblance to Chinese; but the cave has been sadly used by a Zemindar, who tried to blow it up many years ago, hoping to find hidden treasure, and a large piece of rock has been broken away at the very spot where we should have expected to find an inscription." There is scarce room to doubt that this is the very site of the hall of the first convocation "at the entrance to the Sattapanni cave on the side of the *Webharo* mountain," and the precise spot where, as Fa hian assures us, "Foe, after meals habitually resorted to meditate;" and if subsequent investigation shall confirm this identification, it affords great encouragement to Capt. Kittoe to prosecute his labours in this interesting locality with renewed vigour. All the short inscriptions he mentions should be carefully copied. I fear, however, that the expense of digging and of clearing away the rubbish, without which no important result can be expected, will prove his greatest impediment.

Notices of some copies of the Arabic work entitled "Rasáyil Ikhwán al-ṣafá و خلآل الوفا— By Dr. A. SPRENGER, Communicated by H. M. ELLIOTT, Esq. V. P.

In the year 1812, the Rev. T. Thomason published a fragment of this work, which by the novelty of the ideas, the peculiarity of style, and even of the language, created considerable sensation. Baron Von

Hammer reviewed this publication in the *Jahrbücher der Literatur*, and shed some light on the origin of the book ; and in 1837 Mr. Nauwerk published a monography on it.

A further notice of this curious production would be uncalled for had these scholars been in possession of a complete copy, or were there a complete copy to be found in Europe.

In the *Tawárykh al-Hokamá* of Shahrzúry we find the following passage on the origin of these memoirs :—

ابو سليمان محمد بن مشعر النسبي و يعرف بالمقديسي و ابو الحسن بن
زهرون الريخاني و ابو احمد النهرجوري و العوفى و زيد بن رفاعة فعلم حكماء
اجتمعوا و صنفووا رسائل اخوان الصفاء و الفاظ هذه الكتاب للمقديسي

“Abú Solaymán Mah. b. Mosh'ir b. Nasby, who is known by the name of Moqaddisy, and Abú al-Hasan b. Zahrún Ryhány, and Abú Ahmad Nahrajúry, and al-'Aufy, and Zayd b. Rofá'ah are the philosophers who compiled the memoirs of the Ikhwán al-ṣafā, which have been recorded by Moqaddisy.” The date is not stated, but in the book from which this passage is derived mostly the chronological order is observed, and this note occurs immediately after the biography of Faryáby who died A. H. 319, we may therefore suppose that Moqaddisy flourished about the beginning of the fourth century of the Hijrah, M. Gayangos (Mohammadan dynasties in Spain I. p. 429) has shown that they were imported into Spain by Majaryty who died in A. H. 398. It is probable that Nahrajúry, one of the compilers, is identical with Abú Ya'qúb Ishaq b. Moh Nahrajúry, who is mentioned in Ooshayry's letter to the Gúfys,* and who died at Makkah in 330.

I have seen four copies of the *Ikhwán al-ṣafā* in India : a complete copy is preserved in the Moty-mahal library of the king of Oudh ; a splendid MSS. of the second half, beginning with page 336, and the 24th memoir, is in possession of the Asiatic Society of Bengal. It was written at Fayzábád in 1184, and contains marginal corrections by another hand ; unfortunately there are several lacunas in it. A third and rather valuable copy containing chapters 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 17, 15, 16, 30, 31, 33, 34, 35, 36, 37, 38, 39, 5, 6, 47, 48, 49, 50, 51, conclusion, 42, 43, 44, 40, 41, belongs to Mufty Sadr

* See also Jámý's *Salahát*, N. 140.

al-dyn of Delhi, and a fourth fragment, containing about one-eighth of the work, is in my possession.

The book is divided into four sections : the first treats on Mathematical Sciences, فنون جسمانية رياضية ; the second on Natural Philosophy, فنون طبيعية ; the third on Psychology and Speculative Sciences, فنون نفسانية عقلية , and the fourth on Religion and Metaphysics, فنون ناعومية آلهية.

Section 1.—Abstract Sciences.—Memoir on numbers ; the elements of arithmetic ; metaphysical theories (of Pythagoras, who is repeatedly quoted) on numbers. Four is considered the basis of the decimal system, for it is said, $1+2+3+4=10$. The authors have a fancy for the number four, because there are four elements.

2. The Elements of Geometry. This chapter contains little more than the definitions of Euclid and the methods of calculating the area of a triangle.

3. Astronomy. This chapter gives a very clear view of the system of Ptolemy.

4. Music and the elements of versification.

5. On Geography.—Many authors dwell particularly on Mathematical Geography, which is treated very much in the same manner as by Abúlsedá, but it is considerably fuller. In the detailed description of the climates, the tables showing the longitude and latitude of places are unfortunately omitted in the code before me, but the space left blank to receive them is very small, and they cannot have been of much importance. The following is the description of the first climate : “This climate is 9000 miles, or 3000 farsangs long from east to west, and 445 miles, or 146 farsangs, from south to north. It begins at the equator, &c. &c. see Abúlf. p. 8. In this climate are chains of mountains which are from ten to one hundred, and even one thousand farsangs long ; there are no less than thirty large rivers, some of which are 20, others 100, and others 1000 farsangs long, and it contains about fifty large and celebrated cities. The most eastern country of this climate is the island of Niphon, لنفرون ; then comes southern China, then the south of Ceylon, then central India, then subcentral and Sind, then beyond the Persian Gulf the south of 'Omán, then comes the centre of the country of Shir, then central Yaman, then across the Red Sea, central Messynia ; then across the Nile is Nubia ; then the centre of the

country of the Barbar; then comes southern Bartáyitah, برتايته, and finally the western ocean. Most of the inhabitants of this climate are black." Here follows a blanck of space of about three inches for the names of the principal cities. I believe this is the only Arabic author who mentions Niphon; the island of Waqwáq, which is far east of China, and which is frequently mentioned by Asiatic Geographers is probably the Fu-sang of Chinese writers, which has been lately identified with Mexico.

"*Second climate.*—It has about 17 great mountains and as many great rivers, and about fifty large and celebrated cities. Proceeding from the east, we come first to central China, then to the north of Ceylon, then to northern India, then to Kábúl and Candahár, then to the north of Sind and to the south of Makrán, then we go across the Persian Gulf to central Arabia; across the Red Sea, we find Mes-synia, and the south of upper Egypt; on the other side of the Nile is Africa provincia, then the north of the country of the Barbars, then the south of the country of Qayrowán, then central Bartaytah, and finally the western Ocean."

This will suffice as a specimen.

6. On ratios and proportions of quantities (in Arithmetic, Geometry, Music, &c.)

7. On creeds and professions. The definition of "art" is the same which has been given by modern authors on æsthetics الصنعة العملية هي "Art consists in giving body to an idea." The authors seem also to understand that labour is wealth; for they say that a piece of brass which is worth five dirhams will fetch one hundred if manufactured into an astrolab.

8. On sciences. They are of three kinds of professional دواعيية which give us certain abilities by which we may gain our livelihood, they are 1, Reading and writing, كتابة والقراءة ; 2, Grammar and linguistic, اللغة ; 3, Arithmetic, الحساب ; 4, Sorcery, alchemy, short hand, &c. ; 5, Sorcery, alchemy, short hand, إسحمر ; 6, Versification and poetry, المروض والشعر ; 7, Commerce and agriculture ; 8, Trades and professions, حرف صنایع ; 9, History and biography :—b., Religious Sciences the object of which is the salvation of our souls. They are : 1, the knowledge of the Qurán, عالم التنزيل ; 2, of its (mystical) commentaries, الروايات والآخبار ; 3, traditions, علم القوابل ; 4, the

علم الفقه والسنن knowledge of law and ordinances of God and of legal divisions ; والذكير والمواعظ والزهد والتصرف 5 ; والحكام 6, religious duties and ascetics, explanation of dreams, &c. Philosophical sciences, which are first the Mathematical Sciences, or Arithmetic, Geometry and music ; second, logic, in which are comprehended poetry, rhetoric, the topica and sophistica ; third, Natural Philosophy which comprehends the following seven Sciences : the Sciences of the first principles of a body ; those are matter, shape, time, place, and notion ; 2, the Science of the heavens and of the universe which teaches of what matter the stars and heavenly spheres are composed, how many there are, the cause of their motion, whether they are subject to destruction in the same manner as sublunar bodies which are composed of the four elements ; 3, *de generatione et corruptione* ; this Science treats on the nature of the four elements, on the influence of the stars, on sublunar bodies ; 4, meteorology ; 5, mineralogy ; 6, botany ; 7, zoology which comprises anatomy and physiology.—d, metaphysical sciences علوم آلهية to which belongs, 1, theology ; (i. e. the Science of God) ; 2 the knowledge of spirits ; spirits are free from all matter, but act upon it, they are the angels of God, and the spiritual spheres which encompass the spheres of the heavens ; 3, the knowledge of the souls souls which dwell in the spheres of the heavens and in the elements from the ninth sphere to the centre of the earth. 4, The knowledge of government علم السياسة ; 5, the science of things connected with a future state علم المعاد.

10. Memoirs. An abstract of Porphyry's Isagoge in which the "six words" نونع الجنس or genus are explained ; these are سنته الفاظ species (ειδος) ; 3, الشخص individual (ατομος) ; 4, الخاص proprium (αιδον) ; 5, العرض accident (συμβεβυκυς) ; 6, القفل differentia (διαφορα).

11. An abstract of Aristotle's Categories, or on the "ten words" المقويات العشرة they are الجوهر substantia (ουσια) ; 2, المضاد relatum (προσ τι) ; 3, اكيف quale (ποιητη) ; 4, المفاظ quantum (προσ τι) ; 5, ubi (ποιη) ; 6, المتي quando (ποτε) ; 7, الذمة situm esse (κειθειν) ; 8, habere (εχειν) ; 9, يفعل facire (σοιει) ; 10, ينفع pati (νασχειν). The Categories are compared by the authors with the units.

12. An abstract of Aristotle's book "de interpretatione." This memoir contains also an essay on the utility of Logic.

13. Aristotle's *Analytica Priora*.

II Section.

1 (14.) An abstract of the *Analytica Posteriora*.

2 (15.) An abstract of the work *de Cœlo*. Besides discussing some of the questions propounded by Aristotle, our authors enter much into **Astronomy**, which like other subjects, is mystified by them. They assert that the ceremony of walking round the Kábah is expressive of Astronomical data.

3 (16.) *De generatione et corruptione*. This chapter like the preceding differs widely from Aristotle's work of the same name. It contains a popular explanation of Aristotle's ideas on the subject, interspersed with numerous moral reflections, and other extraneous matters.

4 (17.) On matter, space, motion, and time.

5 (18.) On minerals, their component parts, causes of the difference of their substance ; how they are generated in the bowels of the earth ; proofs that they are the first 6 productions of nature in the sublunary regions, or rather the souls of the world, or universal soul, and the lowest step of the ladder by which particular or differentiated souls ascend from the centre of the earth to the highest sphere of the heavens, where they enter into the society of angels (i. e. the highest spheres of the heavens), and into eternal bliss.

6 (19.) What nature (the soul of the world) is ; how it acts on the four elements on their compound productions : animals, plants and minerals ; moral application.

7 (20.) On the various kinds of plants. On their generation ; causes of the differences of plants in shape, colour, taste, &c. ; faculties of the souls of plants. How one class of minerals stands in connexion with plants, and one class of plants with animals, and one class of animals with man, and man with angels. God is the head of the chain of beings.

8 (21.) On the various kinds of animals ; their structure and constitution. Classification of animals, on their habits ; how they educate their young. Proofs that some animals are animated by angels who worship man (an allusion to the Qorán) who is the representative of

God on earth whilst other animals are animated by evil spirits. The specimen of the Ikhwán al-ṣafá published by the Rev. T. Thomas forms part of this chapter.

9 (22.) On the Economy of the human body. Man is a microcosm and his body is like a well regulated city, the sovereign of which is the soul.

10 (23.) *De Sensu et Sensibili.* Though this chapter bears the inscriptions of one of the works of Aristotle, it has little to do with the opinions of that philosopher. Impressions received by the senses are conveyed to the anterior portion of the brain where the faculty of imagination *القدرة المتخيلة* resides; from these, they are communicated to the central portion of the brain which is occupied by the faculties of reflection *القدرة المتفكرة*; then they are committed to memory *القدرة الحافظة*, which has its seat in the posterior part of the brain, &c. (compare Avicenna, Lib. I. p. 35.) Astrological influences on the various parts of the body.

11 (24.) On foetal life; the authors take an astrological view of the subject, naming the planets under the influence of which the foetus is during every month of pregnancy.

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Reports upon His Majesty the KING OF OUDE's Observatory at Lucknow. Communicated by H. M. ELLIOT, Esq. Sec. to the Government of India.

To his Excellency Major General Sir. G. POLLOCK, G. C. B. Envoy to the King of Oude, Dated Lucknow 18th January, 1844.

SIR,— For the information of the Right Hon'ble the Governor General of India, I have the honor to submit my report on the affairs of his Majesty's Observatory during the past year.

Within this period, the Observatory has been rendered as complete in the Astronomical Department as I can expect to see it, by the acquisition of a very fine Equatorial which may be usefully employed on many extra-meridional observations for which an appropriate instrument has hitherto been wanting. It has a Telescope of 9 feet focal length; the polar axis is carried round by clock work, and the hour and declination circles are of 2 and 3 feet diameter. I have been under

the necessity of placing it on the pillar designed for an instrument of this description by my predecessor Captain Herbert, but whatever the advantages gained by an elevation of 35 feet above the ground in enabling the observer to command a more uninterrupted view, they are more than balanced by the disadvantage of the optical power of the Telescope being impaired by the vibrations to which so high a pillar of brick-work must always be liable; and I fear that this beautiful instrument cannot while so placed be applied to all the purposes for which its great power would otherwise fit it.

In the Magnetic Observatory the arrival of the vertical force and inclination instruments has enabled me since the month of April to make the daily routine of observations correspond with that of all the Magnetic Observatories established by Government.

With respect to the subjects on which the instruments are employed:—The observations of the planets are, at the suggestion of the Astronomer Royal, carried forward into the day as much as possible, the lesser planets are likewise at his suggestion carefully observed, and I believe that favored by our climate, we are more successful in frequently seeing them than they are in Europe. Besides the principal stars for latitude, &c., the Zodiacal stars, in number about 500, comprised in the catalogue of Caturegli, have been observed, as also those pointed out by Mr. Baily as requiring observation; and the re-observation has been commenced of the stars of the 3rd and 4th volumes of Mr. Taylor's Madras observations. We have in fact made more observations than we can easily reduce.

In the Magnetic and Meteorological Observatory, observations are made throughout the 24 hours, at each even hour of Gottingen mean time in accordance with the instructions of the Committee of the Royal Society. The term days have been kept and a few instances of magnetic disturbances have been observed in accordance with the same instructions, at every 5 minutes. The periodic experiments on intensity, I am sorry to say, have not yet been included for want of a duplicate instrument on the "Auxiliary" one especially adapted to the purpose, which has been ordered from England some time past, but has not yet arrived. I hope, however, partly to make up for the deficiency by means of a temporary instrument which I have had constructed at Lucknow.

Of the forward state of the reductions, I cannot speak as favorable as I could wish, but this has in a great measure arisen from my first Assistant having been compelled by ill-health to leave Lucknow at the same time that I was called away on Regimental duty, at the end of last year. It is likewise owing to my having undertaken the additional duties of the Magnetic Observatory with an establishment altogether unequal to them, when superadded to those of the Astronomical Department. The Assistant I have alluded to having been incapacitated by continued ill-health, I recommended the employment in his place of 3 educated native youths from the Allahabad school, and the calculations have since proceeded with greater rapidity, the reductions for 1841 having been completed and considerable progress having been made with those for 1842, whole copies of a large portion of the Magnetic and Meteorological Observations have been prepared for transmission to the Committee of the Royal Society. I must not omit to state that I have reason to be highly satisfied with the zeal and ability of my Native Assistants.

His Majesty's pleasure respecting the publishing of the observations has not yet been ascertained; indeed the meridian instruments not having been ready for use till August and September 1841, it seems scarcely expedient to propose publishing a separate Volume for that year. Should His Majesty object to the expense of printing in Calcutta, or (which would be better) in England, the results may be presented to the Astronomical Society for publication in their Memoirs. The observations in the Magnetic Department will all be forwarded to the Royal Society.

I have, &c,
(Signed) R. WILCOX, Major.

Lucknow, 18th January, 1844.

To Captain J. D. SHAKESPEAR, Offg. Resident at Lucknow.

Dated Lucknow, 25th February, 1845.

SIR,—For the information of the Right Honorable the Governor General of India, I have the honor to present my report on the general state of his Majesty's Observatory for the past year. I fear that it will be found somewhat deficient in interest, but I have indeed, little

to mention beyond the facts that the instruments remain in excellent condition, and have been industriously, and as I believe, usefully employed.

The only alteration in the Meridional Instruments, which are in as excellent order as when they were first put up, is the introduction in the Mural Circle of a collimating eye-piece, the invention of Mr. Taylor of Madras, by the aid of which the image of the fixed horizontal wire in the eye end of the Telescope is seen reflected from the surface of Mercury and the zenith point is obtained at a much less expense of time, and I have reason to think with at least equal accuracy, as by the former method of observing the direct and reflected images of several stars. Its use for measuring the collimation error of the transit instrument would be equally advantageous were it not that the great height of the latter instrument above the floor makes its application inconvenient. I have before alluded to the tall pillar on which I was obliged to mount the Equatorial Telescope, and this beautiful instrument has been less frequently employed than under the more favorable circumstances of its pier being shorter and more stable, it might have been ; but a good number of Eclipses of Jupiter's Satellites have been observed, and it is well suited for observing occultations of stars by the Moon, although from the pressure of business in the Magnetic Department, which has occupied a good deal of my own time, it has not been brought into use so frequently for this purpose during the last year as I hope it will be in future.

For the Magnetic Department we have received an instrument which was commissioned two years ago for experiments on absolute intensity, the measurement of which had hitherto been effected with the aid of a less perfect apparatus constructed by myself on the spot. An Induction Inclinometer has also been commissioned to supersede the Balance Magnetometer, which here, as elsewhere, has proved to be an instrument of inferior value ; but its despatch from England has not yet been reported.

The Meteorological Instruments are in good order, and Oster's self-registering Anemometer continues to act well, with the exception of a fault which I observe has been noticed in it at other places, that it is not delicate enough for recording the pressure of the light winds, which more generally prevail.

The course of observations remains unaltered. With the Meridional instruments, the moon has been observed at every practicable opportunity; the larger planets whenever they pass the Meridian between the hours of 5 A. M. and 11 P. M.; and care has been taken to carry forward the observations into the day so long as the planets can be seen and to commence again with them as soon after noon as they can be distinguished. The lesser planets at every opportunity; the stars of the Nautical Almanack have been observed, and a large number of small stars taken from the Catalogues of the Astronomical Society, and from those of Piazzi and Boile, ten observations being considered the least number to be made on each star before it is relinquished in favor of another.

The Magnetical and Meteorological observations have been continued on the plan recommended by the Committee of the Royal Society. The Declinometer, the Horizontal and Vertical force Magnetometers, the Barometer and the wet and dry Thermometers have been observed every two hours day and night, Sundays excepted—there a w point at every four hours throughout the season of the hot winds when ice was obtainable, and when a comparison of it with the results obtained from the wet bulb Thermometer is of most value: the great expenditure of Ether, at other seasons almost precluding its observation throughout the whole year. The Dip has been observed twice on each Tuesday and Friday. The self-registering Anemometer has been in constant use.

Absolute intensity observations have been made from the month of February, when the temporary instrument before mentioned was completed: and temperature experiments on the loss of Magnetic moment of the bars from accession of heat, were likewise then made.

I have made arrangements by which, without any increase of expense to the King, the principal Magnetic and Meteorological Instruments will be observed throughout the present year at every hour, instead of every two hours.

The reduction of our observations remains much more in arrear than I could wish, but compared with the same period last year we have gained very considerably; the whole of the magnetic and meteorological observations for 1842 and 1843, having within the last twelve months been transmitted to England, and a large portion of those of 1844 being in a state of considerable forwardness. When the arrears in this

department have been fairly cleared off, which in a few months more I hope to see effected, the aid of the assistants in the Astronomical Department will not be required to any extent, and as we have now an efficient establishment in both Departments, which was far from being the case when the onerous duties of the Magnetic Observatory were undertaken, I hope to report a rapid recovery of the arrear of our Astronomical reductions.

I have before reported that translations of Dr. Brinkley's Astronomy and of Vince's smaller work on the same subject made under my superintendence, were being printed at his Majesty's Lithographic press. Some little progress has been made with them during the past year; but there is so much employment of various kinds for the press that I fear it will be long before they are completed. A translation of Simm's Mathematical Instruments is being copied for the Delhi Translation Committee. The article on Magnetism from the Library of Useful Knowledge is also ready; and the King has ordered it to be printed. But seeing how long the works on Astronomy have occupied and are likely to occupy, I have not much hope of seeing a third treatise printed here.

I have, &c.

(Signed) R. WILCOX, Major.

Royal Observatory, Lucknow, }
the 25th February, 1845. }

To T. R. DAVIDSON Esq. Resident at Lucknow.

Dated Lucknow the 9th July 1846.

SIR,—For the information of the Right Hon'ble the Governor General, I have the honor to present a report on His Majesty's Observatory.

As it might be interesting to His Lordship to have some account of the equipment of the Observatory, it may be proper to mention that our Transit Instrument and Mural Circle are upon the same scale as those at Greenwich, on the model of which they were indeed constructed by the same maker.

The Equatorial is likewise a fine instrument, having a telescope of 9 feet focal length, but its efficiency is a good deal impaired by its being

raised to a considerable height above the ground upon ~~the~~ slender a pier. The clocks are by Molyneux, one of the best of the present makers. The whole of these are in as fine order as when they were first placed upon their piers, with the exception of the Transit, the Micrometer of which being peculiarly exposed to injury, has suffered from an accidental blow during the past year, but fortunately the injury is of little detriment to the use of the instrument.

In the Magnetical department our instruments are similar to those with which the Observatories established by the British Government and by the Court of Directors were equipped, and our Meteorological instruments are also similar.

It is my endeavour to employ the Meridian instruments, firstly, on all those objects which cannot be so well observed in Europe, the larger planets therefore have hitherto been always observed when they have passed the Meridian between the hours of 5 in the morning and 11 at night, and will for the future be also observed at all hours whenever they are south of the equator; great care is taken in observing the moon and moon culminating stars, and the smaller planets, which are not well seen in Europe, are observed at all hours; we are also determining the places of a large number of the smaller stars by at least 10 observations on each. The methods of ascertaining the amount of the various corrections to be employed are nearly the same with those adopted at Greenwich.

In the magnetical and meteorological department since the commencement of 1845, in lieu of two hourly observations, we have taken them at each hour of the day and night of Gottingen time.

The observations of this class, in the form of abstracts showing the hourly and daily mean readings for each instrument, have hitherto been forwarded to the Royal Society, with the expectation that they would be published in their transactions, either in the extended form in which they are forwarded, or after discussion by a Committee of that Society; but the Board of Ordnance having ordered the observations taken by the officers employed under their direction to be printed at the expense of Government, and the Court of Directors having likewise undertaken to print those made at their own observatories, it may become necessary to ask the King of Oude to incur the expense of completing by publication the work which he has so liberally commenced.

No arrangement has yet been made for publishing our Astronomical observations, and it has always appeared to me that unless we had a printing press on the spot so that it might be done under my own inspection and revision, it would be difficult to get them printed in India, since it is not to be supposed that people capable of the task would be found attached to the printing establishments in Calcutta, while if there were, the expense would probably be greater than in England, where it could be done much better. The practice in the Royal Observatories ~~England~~ and larger public ones, as Cambridge and Edinburgh, is to publish yearly, and it is considered important that the crude observations should be given in detail in order that the means of verification may at all times be at hand, and as I believe the Lucknow observations will be found equal to any that are made, it may be desirable that ours should be published in the same form. It has, however occurred to me that if a copy of our crude observations, with all the details necessary in case of need for the verification of our computations, were made over to the Royal Astronomical Society, in whose custody they would always be available, that then there would be no absolute need of publishing more ~~our~~ results, which might appear from time to time in their memoirs. I have accordingly placed myself in communication with the Secretary, who is also one of the most influential members of the Society, and have lately been favored with his opinion, and find that he coincides with me in thinking that this mode of publication would have all the advantages that I propose, while the saving of expense would be great. I am also told that on the proposition being formally made, I need have little doubt but it will be accepted by the Society, but that according to an established rule, which has in no instance been departed from, the printing must be done at the King's expense.

I do not apprehend that the King would refuse to pay the cost, which could not be very heavy, but it will be proper before taking further steps, to ascertain whether this course would be acceptable to his Majesty, or whether he would not prefer to expend a much larger sum in order that the volumes might appear solely in his name.

My establishment being more efficient for making observations than for reducing them, our computations are still very much in arrears, but we have entered upon a portion of the reductions for 1844, and I hope before the end of the year to have made great progress with them. I

must not close this report without expressing my satisfaction with the zeal and industry of my assistants who, with the exception of one, are young Hindoos from the College of Agra and the Allahabad school.

I have, &c.,

(Signed) R. WILCOX, Lt.-Col.

Director of the King's Observatory.

Royal Observatory,

Lucknow, the 9th July, 1846.

From Lieutenant Colonel R. WILCOX, Superintendent of Observatory,

To Colonel A. F. RICHMOND, C. B. Resident at Lucknow,

Dated Lucknow, 24th March 1848.

SIR,—I have the honor to submit to you, for the information of the Right Honorable the Governor General of India, a report on his Majesty's Observatory, which is under my care.

The Meridian Instruments, i. e. the Transit Telescope and Mural Circle which are on the same scale and by the same makers as those of Greenwich, remain in excellent order. The Equatorial is still in the unsatisfactory state alluded to in former reports, and has in consequence been little used as a measuring instrument, the want of stability of the high pillar on which it is mounted is such, that it is difficult to form any judgment whether the apparent defects of the instrument are not mainly to be attributed to the defects of the pier alone.

The Magnetical and Meteorological instruments for daily observation are in perfect order.

The meridian instruments have been employed, as in former years, in determining the places of a great number of the smaller stars, by at least 10 observations in right ascension and north polar distance of each; the Moon and Moon-culminating stars are observed as frequently as possible, the larger Planets when they are south of the Equator at all hours; and whether north or south at all hours during the day whenever they can be seen with sufficient distinctness, and favored as we are by climate and position. I have remarked that we have occasionally been successful in continuing our day light observations for two months longer than appears to have been practicable at Greenwich, of the smaller Planets; Ceres and Vesta, and sometimes Pallas, have been observed whenever it has been practicable; of these

likewise we have been able to collect a larger number of observations in one year than has been done in Europe. On account of their small size we have not been very successful in seeing Pallas and Juno, the latter indeed has seldom if ever been satisfactorily observed.

The time has scarcely yet arrived when observations made at so distant a spot could be turned to any account of those Planets which have been recently discovered. We have not however failed to observe Neptune from the month of November until it passed the meridian too ~~late~~ to be visible.

The hourly observations of the magnetical and meteorological instruments I propose to continue until the close of 1848, and if on reference to England it should appear desirable, they can at a trifling cost be carried on beyond that time; but as it is improbable that the King will choose to incur the expense of printing them, and they have already become very voluminous in manuscript, I doubt the advantage of it; while on the other hand, the time now bestowed on their reduction could be employed in reducing our astronomical observations, the computations of which, though more forward than at a similar period last year, are still much in arrears; complete abstracts of our magnetical and meteorological registers will continue to be forwarded to the Royal Society.

With respect to the printing of our astronomical observations, in my last report I mentioned, that the course which on account of there being no printing press on the spot, appeared to me to be fraught with the least difficulty, was to request the London Astronomical Society to print our results, that is, results only, in their memoirs, which at the King's expense, I have no doubt they would willingly consent to do, complete copies of our crude observations being furnished to them to be placed amongst their records for reference; but I expressed a doubt whether on the question being submitted to him, the King might not prefer to expend a larger sum in order to have the volumes appear solely in his own name. Mr. Davidson had the kindness to take much trouble in ascertaining the King's wishes on the subject, and the result was as I had anticipated, that he preferred the latter course, though possibly because the cost weighed heavily in the King's estimation, some months elapsed before permission reached me officially to expend the sum of six thousand rupees in printing the observations of 3 successive years.

This sum, in the absence of proper data on which to found a calculation, I had myself named as likely to be sufficient, but I have lately received estimates from two of the most respectable of the London printers (one being the printer of the Greenwich observations) which would make the cost nearer to 12,000 than 6,000 rupees for 3 volumes ; the question therefore remains for the present unsettled, but it seems desirable that the mode of printing which I first gave the preference to, should be finally adopted. The great advantages that would be found in having a printing press working under my own eye have not escaped me, but Colonel Boileau's experience proves that the services of a professional printer would be absolutely necessary, and hence it is doubtful whether by this means the expense would be materially lessened.

I have mentioned in former reports that a translation of Brinkley's Astronomy, made under my supervision, was being printed at the King's Lithographic press : I have now the pleasure of announcing its completion.

I have, &c.

(Signed) R. WILCOX, Lt.-Col.

Supdt. of Observatory.

Observatory, Lucknow, the 24th March 1848.

A Sixteenth Memoir on the Law of Storms ; being the Hurricanes of the MARIA SOMES and other ships, in the Southern Indian Ocean, in March 1846. By HENRY PIDDINGTON, President of Marine Courts of Enquiry, Calcutta.

The appalling catastrophe of the suffocation of fourteen individuals, with the maiming of others, and the severe sufferings and narrow escape of the whole detachment of 320 men, women and children of H. M. 90th Foot, on board the transport ship *Maria Somes* from Ceylon to England, excited much attention both in India and in England at the time, and I spared no pains to collect from every quarter data for the investigation of this hurricane. I have not been very successful, but as ships do not now sail in fleets we have usually a task of no small difficulty to collect together the scattered logs of the few vessels,

which may have crossed a frequented tract of ocean about the time of any severe weather, as long periods elapse before their return to the port, if they return at all. This and the completion of my new work* has prevented me from publishing sooner the results of what I had obtained. Nevertheless it will be seen that the facts demonstrate a new peculiarity in these mysterious phenomena, of no little import to the Mariner, since it may occur in other parts of the world, as well as within the dangerous tract to which this Memoir alludes. I refer to the summary at the end for full details of this new feature in the Hurricanes of Tropical Seas.

Abridged Log of the Barque ORIENT, Capt. WALES, reduced to Civil time.

22d March, 1846.—At noon in Lat. $8^{\circ} 12'$ South; Long. $79^{\circ} 28'$ East; running to the South and S. S. W.: Westerly winds.

23rd March.—Noon, Lat. $10^{\circ} 17'$ S.; Long. $79^{\circ} 00'$ East; towards noon heavy S. S. E. swell; thick cloudy weather and wind S. S. W.; P. M. W. N. W. wind died away.

24th March.—Gloomy dark weather and drizzling rain with a heavy short S. E. swell. No observations; Bar. 29.76, Simp. 29.62, Ther. 81° ; P. M. light westerly breeze and then “wind veering all round the compass,” with dirty unsettled weather. Very heavy southerly swell.

25th March.—A. M. squally from the N. W. and N. E. and veering again from North to East. No observation; Bar. 29.57, Simp. 29.46; P. M. thick, rainy, gloomy, heavy appearance. 4 P. M. Bar. 29.50; at 6, 29.45; at 8, 29.40; at 10, 29.40; at midnight 29.35. Wind variable from N. W. to N. E., S. E. and by 8 P. M. a gale from E. $\frac{1}{2}$ S. when the ship hove too on the port tack; blowing in hard squalls with thick weather to the Eastward. Simpiesometer also fell from 29.40, at 4 P. M. to 29.20, at midnight; wind at 10 P. M. East; at midnight E. b. N.

26th March.—A. M. furious squalls and high sea; wind N. E. b. E. at 2. A. M.; E. N. E. at 4; E. b. N. at 6; and E. b. S. at 8. A. M.

At noon wind is marked as “veering gradually round to South” with very heavy squalls and a high confused sea, and from 8 till noon “gale

* The Sailor's Horn Book for the Law of Storms in all parts of the world. Jan. 1848.

blew furiously with every few minutes terrific gusts threatening to dismast us. Sea running tremendously in every direction and perfectly white with foam. At noon a perfect hurricane." Bar. 2 A. M. 29.35, Simp. 29.20, Ther. 81°; at 4, 29.30, Simp. 29.16; at 6, 29.30, Simp. 29.16; at 8, 29.20, 29.5. At 12, 29.10, and 28.95; Simp. 29.95. P. M. hurricane, wind veering from W. S. W. to W. b. N. Bar. 29.10, Simp. 28.95. At 6 P. M. the same, wind marked W. N. W. and at 9, N. N. W.; Bar. at 6 P. M. 29.30, Simp. 29.20.

27th March.—A. M. hard gale N. N. W.; squalls not so strong; Bar. 29.40, Simp. 29.30. 5 A. M. moderating fast; Bar. 29.50, Simp. 29.40. 9 A. M. bore up to S. b. W. and made some sail; Bar. 29.65, Simp. 29.55. 10 A. M. squally, thunder, lightning and heavy rain. 11 A. M. hove to again and turtled every thing, Bar. having fallen to 29.60, and Simpiesometer to 29.50, in a run of 15' to the S. b. W. P. M. fresh gale, North, hard squalls and heavy cross sea. 6 P. M. Bar. 29.60, Simp. 29.50, Ther. 80°. 9 P. M. bore up again and made some sail, steering S. W. with wind North.

28th March.—A. M. steering S. S. W. and South. 6 A. M. hove too again on account of the weather and sea; noon wind North; Lat. Indiff. Observation, 12° 33' S. Long. Acct. (worked back from the 29th) 76° 54' East; Bar. not noted. P. M. bore up; wind North; course South, and at 5 P. M. S. W. b. S. 6 P. M. Bar. 29.60, Simpiesometer 29.50, Ther. 80 $\frac{1}{2}$ °. Midnight hard gale, "very threatening appearance in the weather, not wishing to run more to the South *as the weather got worse every mile*" and Bar. falling again to 29.50, and Simp. 29.43, hove too at 1 A. M. on the 29th, having run 86' South and S. W. b. S.

29th March.—A. M. wind at N. N. W. 6 A. M. hard gales with squalls and rain and a very high sea running in all directions; Bar. 29.55, Simp. 29.50; noon more moderate; Lat. 14° 36' S. Indiff. Observation; Long. 76° 28' East. P. M. wind North. 4 P. M. bore up again. 8 P. M. wind N. N. W. Lightning to the South at 10 P. M.; midnight severe gusts.

30th March.—A. M. wind N. W. moderating to noon, when fine; Lat. 15° 4' S. Long. 75° 45' East; 8 A. M. Bar. 29.80, Simp. 29.78, Ther. 80 $\frac{1}{2}$. Noon Bar. 29.87, Simp. 29.77.

31st March.—Light Westerly breeze; 7 A. M. Bar. 29.90, Simpiesometer 29.80, Ther. 82°; Lat. Obs. 15° 46' S. Long. Chr. 75° 14' East.

Abridged Log of the French Ship LE GRAND DUSQUENE, from Calcutta to the Mauritius. Civil time.

25th March, 1846.—Noon wind N. N. W. ship standing to the S. W.; Lat. $10^{\circ} 4'$ S. Long. 81.22, East (of Paris?) and thence $83^{\circ} 42'$ East of Greenwich. For the preceding 24 hours the weather cloudy and a high confused sea, the wind from N. N. W. to N. W. p. m. squally wind N. N. W., ship standing to the S. W. under double reefs.

26th March.—A. m. wind N. N. E. to North; heavy sea; noon Lat. $11^{\circ} 19'$ Long. 79.54, E. Paris; 82.14, Gr. p. m. wind North. 5 p. m. N. N. E. to N. E. weather and sail as before to midnight.

27th March.—Heavy squalls, dark weather with torrents of rain. A. m. wind N. E. and East to noon, when Lat. by Acct. $12^{\circ} 20'$ S. Long. 77.54, E. Paris, $80^{\circ} 14'$ Gr. p. m. to midnight heavy gale, apparently increasing to hurricane violence, from the N. E. to 4 p. m. N. E. to E. N. E. to 7 p. m. and E. N. E. to midnight; ship scudding right before it under foresail, and double-reefed maintopsail. 11 p. m. hauled up the foresail and the maintopsail blew away. Hove or broached to (it is not noted which).

28th March.—A. m. wind N. N. E.; vessel buried in the sea. At 3 a. m. cut away the mainmast, which carried away the foretopmast and head of the foremast, the foremast, foreyard and bowsprit also went with them. At noon wind marked N. N. E.; Lat. Acct. $13^{\circ} 18'$; Long. $77^{\circ} 15'$ E. Paris, or $79^{\circ} 35'$ Gr. p. m. wind N. N. E.; threw 120 bags rice overboard; 5 p. m. wind N. N. W. and variable to midnight.

29th March.—Weather the same; 5 a. m. wind N. N. E.; 8 a. m. more moderate. Noon, Lat. $13^{\circ} 43'$ S., Long. $77^{\circ} 38'$ E. Paris; $79^{\circ} 58'$ Gr. p. m. wind N. N. E. At midnight fine.

30th March.—Weather continuing fine; rigging jury-masts and throwing cargo overboard.

Noon Lat. $13^{\circ} 47'$ Long. $78^{\circ} 00'$ E. Paris, or $80^{\circ} 20'$ E. Gr.

On the 31st Lat. $14^{\circ} 54'$ S. Long. $74^{\circ} 4'$ E. Paris, $76^{\circ} 24'$ of Greenwich by observation and Chr. by Acct. Lat. $14^{\circ} 42'$ and Long. $77^{\circ} 37'$ East of Paris, or $79^{\circ} 57'$ of Greenwich. The vessel and having been drifted, as would appear from her log, 213' to the westward and 12 miles to the Southward, or about 71' per day for the three days

of heavy and hurricane weather ; the exact drift being S. 87° W. 214 miles, but as it was undoubtedly at the highest rate when the vessel was nearest the centre, we may call the drift $3\frac{1}{2}$ degrees of westing and $12'$ of southing, and allowing the southing, which is a trifle, to have been made equally on each day allow this to be a westerly or storm-wave drift.—

For the 27-28th, when the *gale* increased to hurricane violence, of one degree, which would give us as a corrected position for the 28th, Lat. $13^{\circ}22'$. Long. $78^{\circ}35'$ East of Gr.

For the 28th to 29th of two degrees, giving for the 29th, Lat. $13^{\circ}51'$ S. Long. $76^{\circ}58'$ E. of Gr.

For the 30th, being at the close of the gale, of half a degree, giving for that day Lat. $13^{\circ}59'$ S. Long. $77^{\circ}06'$ E. Gr.

On the 31st the position as shown by observations is $14^{\circ}54'$, S. Long. $76^{\circ}24'$, E. of Gr. and these corrected positions are thus marked on the chart. They are, it is true, to some extent uncertain, but the log is very well kept and the leeway carefully marked, and had the difference between the position and account been owing to the drift or storm current it would have been an excess of *southing* and not of westing, the wind throughout being from N. N. E. to N. N. W. This is therefore a distinct case of the storm-wave.

Abridged Log of the Ship COVE, Capt. SPRATT, from Calcutta to the Mauritius—Civil time.

On the 23d *March* 1846—the *Cove* was at noon in Lat. $11^{\circ}18'$ S. Long. $79^{\circ}46'$ E. having run from midnight with a smart rainy breeze variable from N. N. W. and N. N. E. to the S. Westward, but at noon it was calm and rainy with a high sea from S. W. and also a N. Westerly one, creating a very confused sea together. P. M. calm, rain and variable, but at 8 p. m. breeze increasing to a gale ; at 9 wind E. S. E. with hard squalls, rain and high sea.

24th March.—Gale increasing to noon with a high S. E. sea. Lat. Acct. $12^{\circ}49'$ S. Long. $77^{\circ}46'$ E. P. M. wind S. E. ship running till midnight to the S. W. and S. W. b. W.

25th March.—The same wind, but fine weather though with hard squalls at times. Lat. Acct. $14^{\circ}15'$ S. Long. $75^{\circ}16'$. P. M. The same, decreasing at midnight to a fresh breeze but a heavy sea breaking on board at times.

26th March.—By noon fine weather and a strong trade. Lat. Acct. $15^{\circ} 38' S.$ Long. $73^{\circ} 5' E.$

Abridged Log of the Barque DUNCAN, Capt. FAWCETT, from Cadiz to Calcutta—reduced to Civil time.

26th March, 1846.—At noon the *Duncan* was in Lat. $16^{\circ} 47' S.$ Long. $78^{\circ} 19' E$, with strong breezes from East and squally weather since midnight; a high cross-sea and vessel labouring and lurching heavily. Simpiesometer oscillating a little between 29.76 at 2 A. M., and 29.79; at noon 29.76. Running 7 knots to the N. N. E. P. M. wind E. b. S. To midnight the same. Simpiesometer 29.68, Ther. 81°.

27th March.—A. M. wind East, squally and rain; course N. N. E. 5 knots; noon Lat. $14^{\circ} 43' S.$; Long. $78^{\circ} 54' E.$; Simpiesometer 29.59, Ther. 81°; Ship under double reefs. P. M. increasing wind and gloomy looking weather. “Prepared for a hurricane, and at 6 P. M. hove too with wind East; at midnight strong gales, hard squalls and vivid lightning.

28th March.—To noon lying too with a heavy gale, hard squalls, torrents of rain and vivid lightning occasionally; heavy sea getting up. Wind marked E. N. E. Lat. Acct. $14^{\circ} 11' S.$; Long. $78^{\circ} 16' E.$; Simpiesometer 29.46, Ther. 82° P. M. Heavy gales; N. E. b. N. At midnight vivid flashes of lightning all round the horizon; Simpiesometer 29.48.

29th March.—A. M. to noon heavy gales and high sea; 4 A. M. wind N. b. E.; 10 A. M. North; “5 A. M. a most singular phenomenon occurred about two miles astern of the ship; the water was rushing and foaming up to an astonishing height, gyrating round a centre and passing the track (wake*) of the ship with astonishing velocity. The diameter or breadth of the vortex of the whirlwind could not be less than 2 miles from the appearance of its spread, and how far the circle of its attraction extended I was unable to guess.”

Noon no abatement of the gale and a very high sea; Lat. observed $14^{\circ} 45'$; Long. $78^{\circ} 00'$. Simpiesometer 29.50; Ther. 82°. P. M. strong gale N. b. W.; 6 P. M. N. N. W.; 4 P. M. beginning to moderate; midnight strong wind only, with squalls and lightning; Simpiesometer 29.60.

30th March.—Noon moderate and fine; Lat. $14^{\circ} 20'$; Long. $78^{\circ} 50'$; Ther. 63° .

* As she was then lying to.

Abridgment of an extract from the Log of the Transport MARIA SOMBES, (No. 24), WILLIAM KING, Commander, from Ceylon to England. Civil time.

It is necessary to note here that this extract from the Log is so far imperfect that it begins on the 27th March only, though it would appear, and this, as will be seen is important, that they had had some bad weather before, as indicated by the expressions which I have marked with commas or in italics. A Mauritius newspaper says that she "experienced a hurricane in 15° S. 78° East;" which may be the approximate position of this day?—and another that the *Maria Sombes* experienced "dreadful weather from the 24th to the 31st March," so that we certainly have not the whole of the bad weather, but only the latter part of it.

27th March, 1846.—A. M. moderate winds, variable,* and cloudy with squalls and rain; lightning from the Eastward; heavy cross sea. In third reefs, furled foresail; 6 decreasing wind, and hazy; out 3rd reefs and set reefed foresail. At 8 light wind and cloudy; *out reefs of courses, to dry, being split; sea going down and every appearance of fine weather. Barometer still down to 28.50, no change.* Course S. S. W. 36' to noon. P. M. course S. S. W.; wind now marked W. N. W. with which the log is marked to 3 P. M. 14' to the S. S. W., making altogether from midnight 50 miles run to the S. S. W. P. M. moderate wind and sea going down; *no change in the Barometer; still standing at 28.50.* 1 P. M. close reefed fore and maintopsail, unbent the split mainsail and commenced bending the best foresail; "the gale increasing or *westerling* (the word is *pestering* in MSS. and I am doubtful which was meant;) put the courses below. At 2 increasing "furled foretopsail and hove too with ship's head to S. S. W.; wind at West veering to the North;" secured yards, sails and every thing for bad weather. At 3 a terrific gale burst on the ship, throwing her completely on her beam ends; sea drifting over her in the most furious manner, when she lost the three topmasts, jib boom, &c. At 8 blowing a dreadful hurricane to midnight.

28th March.—A. M. "hurricane still raging in a most terrific manner; at 2 A. M. wind veered from N. W. to North and back to West."

* Direction not marked.

During the whole day the vessel in the utmost distress and people suffocating ; crew nearly all paralysed with fear ; direction of the wind not given. During the night the hurricane sensibly moderated. It is noted that "three strong men were required to carry a hammock rolled up into the mizen rigging," from the excessive violence of the wind.

29th March.—"Hurricane blowing with unabated violence :" 1 p. m. cut away the mainmast ; some abatement taking place hatches were partly opened and *fourteen persons found suffocated!* Even in the cuddy the passengers women and children were in a dying state from exhaustion. Direction of the wind is not marked.

30th March.—"Continued gale and heavy rolling sea ; Barometer is stated to be" rising from 28.20, to 29.20, and the gale subsiding fast ; Lat. observed $16^{\circ} 55'$; no Longitude given.

31st March.—Moderate and cloudy. Head S. W. ; wind S. S. E. Lat. observed $17^{\circ} 05'$; Long. $78^{\circ} 07$, East.

Abridged Log of the American Ship Loo Choo, Captain Hatch, from Canton to New York—reduced to Civil time.

28th March.—Noon to midnight running to the W. b. S. $\frac{1}{2}$ S. $99\frac{1}{2}$ miles, with the wind E. S. E. brisk trade and squally ; position at noon not given.

29th March.—A. m. to noon the same course, $106\frac{1}{2}$ miles. No position given ; p. m. to midnight the same course, 108 miles. Breeze increasing and sail reduced ; midnight closereefing, blowing very hard in squalls.

30th March.—At 3 a. m. "gale suddenly increasing," hove too ; head S. S. E., wind therefore about E. b. N. at 6 A. m. and to noon the course (ship's head) is marked as "South off to North." Ship hove too with only a tarpaulin in the mizen rigging ; daylight "increasing and veering to the Southward." By noon had lost maintopmast, boats, &c. Lat. $18^{\circ} 00'$ S. ; Long. $77^{\circ} 33'$ East by Acct. 1 p. m. cut away the mainmast. Wind marked as "about South," and from 1 to 4 as "South to West," and "ship lying West to North." At 4 the wind abated a little. At 5 quite moderate and set the foresail. At 8 p. m. wore, and at midnight fine, being in Lat. $17^{\circ} 38'$; Long. $76^{\circ} 00'$.

31st March.—Noon, Lat. $18^{\circ} 04'$; Long. $76^{\circ} 00'$ E.

SUMMARY.

As there are evidently the records of two or three separate storms in the foregoing documents, I shall begin, in explaining the reasons for the tracks assigned to them, with that which is first in order of date, as well as to the Northward on the Chart, which is the *Orient's* hurricane. This ship was evidently gradually approaching a zone of threatening weather from the 24th of March, or rather from the P. M. of the 23rd. On the 25th the Barometer had been and continued steadily falling, and by 8 P. M. on this day she had "a gale" from the E. & S., and hove to on the port tack. Simpiesometer falling from 29.40 at 4 P. M. to 29.20 at midnight ; the Barometer from 29.50 to 29.35. "Thick weather to the Eastward" is also noted. There is no doubt then that by this time she was involved in the vortex of which the centre bore about N. by W. from her at midnight. By the rule given at page 199 of my new work, the *Sailor's Horn Book*, the fall of the Simpiesometer being taken as the average one,* of about .025 per hour, the distance of the centre from her between 8 P. M. and midnight, or say at 10 P. M. may have been about 200 miles, which would place it in about Lat. $8^{\circ} 30' S.$, Long. $77^{\circ} 18' E.$, and it was either travelling down much faster than it did on the following days, or this distance is too much ; but in either case the rule holds good, because the seaman should never allow less than 10 or 12 miles per hour. If we suppose the track somewhat curved the distance is 215 miles to the position of the centre at Noon on the 26th, which for the 14 hours from 10 P. M. to Noon is $15\frac{1}{2}$ miles per hour. Hence if the distance was too much the rate of travelling assigned in usual cases corrects it sufficiently for all practical purposes.

From this hour, 10 P. M. we find the wind gradually veering, first as far as to the Northward of E. by N. as N. E. by E. for a couple of hours, then again to the Eastward, and gradually round to South at noon on the 26th. This is while the ship was making an average drift to the S. W. by W. and W. S. W., and would indicate a slight veering of the track (or a somewhat eccentric direction of the wind :) but it is clear that it passed close to the Eastward of the *Orient*, and very rapidly, by the veering from East at 10 P. M. to South at noon, or

* Because the Barometer tide was for this time, 4 P. M. to 10 P. M. against the fall ; i. e. it was the time of the rise.

eight points of the wind-circle in the fourteen hours, and of these 7 points, or from E. b. S. at 8 A. M. to South at Noon, are marked in the last 4 hours of this interval; the Bar. is also marked at this time at 28.95. If the storm was really formed and coming down, as we have now supposed, its rate of progression at this time was $15\frac{1}{2}$ miles per hour, which is not excessive, and the "terrific gusts threatening to dismst the vessel" "with the sea running tremendously in every direction," are exactly the weather and sea to be now looked for. We find that in the interval from Noon to 2 P. M. the wind was W. S. W. to W. b. N., at 6 W. N. W.; and at 9 N. N. W. to midnight, the Barometer being "inclined to rise;" at 4 P. M. and at 6 it is marked 29.30. The wind continues up to midnight at N. N. W. From this it would seem that the vessel from being close upon the centre* which passed close astern (to the Eastward) of her, at noon was drifted rapidly into and round the Northern semicircle, and had the centre by 9 P. M. bearing W. S. W. of her position, the wind being then steady about N. W. to midnight. She may possibly have been carried now to the Southward by the storm-wave, as she might have been before to the Northward, by the same cause, being so close upon the centre. The track, as I have before explained, is marked in a straight line, but it does not follow that it really was one. The storm does not appear on this day to have reached the *Grand Dusquesne*, which vessel, at noon 26th, was at 280 miles from the *Orient*.

On the 27th March at midnight, we have the *Orient* at 1 A. M. with the wind still N. N. W., the Barometer and Simpiesometer rising a little. At 5 A. M. it is said to be "moderating fast," the Barometer having risen one-tenth since midnight, and by 9 A. M. it had risen to 29.65, and the Simpiesometer to 29.55. The ship now bore up and ran 15' to the S. b. W. but by 11 A. M. Capt. Wales prudently hove to, again, the Barometer having] fallen to 29.60, and Simpiesometer to 29.50, with very threatening weather and a high confused sea. At 6 P. M. the Barometer had not risen and the wind was still at North. At 9 she bore up again with the wind still at North. I shall remark presently on the peculiarity of the wind remaining so long at North

* The reader will recollect not only that the centre (or focus) is of course an imaginary point or space, but moreover that it is probable that while many circular storms have no central calm space, some have a very wide one. In time we shall no doubt be able to class these varieties of hurricanes.

and N. N. W. as it did. From the best calculation I can make of the *Orient's* position at noon on the 27th, she was in Lat. $11^{\circ} 31'$ South; Long. $77^{\circ} 00'$ East, and the *Grand Dusquesne* was at this time 205 miles to the E. S. E. of her, with a gale commencing in the usual way, with torrents of rain and wind, till noon, from N. E. to East, showing that she was on the outer verge of a separate vortex.*

The *Duncan* also, at this time, Noon 27th, being 223 miles to the S. E. b. S. of the *Orient*, was under double-reefs, with the wind at about East. In the afternoon she was preparing for bad weather, being also just on the verge of a vortex, which both ships soon after fell into, the *Duncan* heaving to at 6 p. m., and the *Grand Dusquesne* running down on a S. W. and W. S. W. course to midnight, (when she hove or broached to) so as to approach the centre rapidly, for she was obliged to cut away her mainmast by 3 a. m. on the 28th. I have thus placed the centre of the *Orient's* hurricane for this day in $11^{\circ} 30'$ S.; Long. $76^{\circ} 30'$ East, or 30 miles to the Westward of her position, extending the circle to 150 miles in diameter only, as supposing another vortex forming for the *Duncan* and *Grand Dusquesne*, to the Eastward, which by the wind, must have been the case. We can say nothing of the *Maria Somes'* position on this day, or rather of the *supposed* position of that vessel according to the very imperfect log and newspaper accounts which we have from her; and she had at this time the wind about West, so that she was on the *Northern* edge of another vortex. Her very low Barometer (which appears to have remained so from the previous bad weather) is some evidence that it was affected by the *Orient* and *Grand Dusquesne's* storms.†

For the 28th of March we find the *Orient* running and drifting down with a gale (always from the North) 65 miles to the S. S. W. of her position on the 27th; and as the wind was North at noon the centre of her storm must either have moved down parallel to her track or

* This ship unfortunately had no Barometer, at least none is noticed, and this is the more to be regretted that she probably from her position felt the effects of both storms.

† The only instance in which I have been able to obtain a good Barometer note when contemporaneous and closely parallel storms were undoubtedly raging, is that of the ship *Eliza*, Capt. McCarthy, IX. Memoir, Jour. As. Soc. Vol. XII. p.—in which a sudden fall of an inch took place, both storms travelling with considerable rapidity. In the case before us the storms were nearly stationary, that is moving very slowly, as we shall see.

slowly away to the S. W. or S. S. W., so as to keep her always on about the same bearing from its centre. The *Duncan*, which ship had been lying too from 6 p. m. of the 27th, was on this day at noon in Lat. $14^{\circ} 11'$; Long. $78^{\circ} 16'$, her position being tolerably well ascertained, lying too in a heavy gale with the wind at E. N. E., making the centre to bear N. N. W. from her, a bearing which would place it nearly 40 miles to the *Eastward* of the *Orient's* position; for that ship was now lying too with a Northerly gale, and thus *must* have had the centre to the *Westward* of her. It follows therefore that the *Duncan's* hurricane and that of the *Orient* *could not have been the same storm*. The *Grand Dusquesne*, which vessel was dismasted at 3 a. m., had the wind at N. N. E., and the two ships were at this time 52 miles apart. These winds and the positions of the ships would place the centre of their hurricane in Lat. $13^{\circ} 00' S.$; Long. $77^{\circ} 43' E.$, but I have marked it in Lat. $13^{\circ} 12'$; Long. $77^{\circ} 49' E.$, or 21 miles to the S. E. of this spot, both to allow of striking the circle of the *Orient's* storm, and because the exact position of the *Grand Dusquesne*, as shown precedingly is very uncertain. The *Orient* was also probably farther to the Westward than she appears on the chart, which would allow the two storms (for there undoubtedly *were* two, since the *Duncan's* position is so carefully given and the *Dusquesne* passed so close to the centre but a few hours before) more space for their development. Supposing them at a reasonable distance, we can now understand very clearly by looking at the *Orient's* track how it was she found "the weather growing worse every mile she made to the Southward," when she attempted to bear up after this time to midnight.

The *Maria Somes* on this day, the 28th, was probably during the whole of it close to the centre of her hurricane, which was "veering from N. W. to North and back to West," which is an instance of what I have advanced in another work, and in a former Memoir, the XIII. Journal, Vol.—of the *incurving* of the winds.* And it must have been of small extent, as it did not reach the *Duncan*, which ship, it will be recollectcd, was on the Southern quadrant of her storm; yet the two, if

* For if we place in imagination a vessel on a storm card with the wind at West, any incurving must make it, in the Southern hemisphere, N. Westerly and gradually North-erly, by which time she will be drifted (and the storm have moved down) so as to bring it again to West if it is moving to the Southward as this was.

we have laid down the *Maria Somes*' position at all correct, were not more than 90 miles apart! I have thus given the *Maria Somes* a storm circle of 120 miles in diameter only for this day, marking a small incurving vortex at the centre.

We have thus the remarkable fact ascertained of THREE separate hurricanes raging together at the same time, of which two certainly were of excessive, and one of them of terrific violence, since it dismasted and nearly destroyed the *Maria Somes* and dismasted the *Loo Choo* on the following day, and this too occurs within a space of five or six square degrees, the centres of the two most distinct ones not being 4 degrees apart, and all this occurs in the fatal Storm Tract* to which I have so frequently referred and so urgently warned the mariners of our Eastern seas against

For the 29th of March, we have now the *Orient*, which ship in the latter part of the 28th had run 36' to the Southward, lying too at noon with the wind still at North, so that the centre of her storm must have been bearing West of her position, which however must be on this day considered as very uncertain, but there is no sort of doubt that it was travelling down with her somewhat as shown in our chart. The *Duncan* and *Grand Dusquesne*, 78 miles apart, had, the first with the wind about N. b. W., her "gale continuing without abatement," the second with her storm abating rapidly and the wind about N. N. E. This last wind, as will be seen by the chart does not agree with the *Duncan's* storm as before, but rather appears (supposing always positions to be tolerably correct, though in truth they are, after a continuance of such weather but approximations) as if the *Dusquesne's* storm had disappeared, since it was getting fine at noon, or had fallen into the *Orient's* storm circle, leaving a smaller one for the *Duncan*. We may suppose it possible that the fearful whirlwind seen by the *Duncan*, at five A. M. was an effect of this partial coalition between the storms.*

The *Maria Somes* on this day, 29th, cut away her mainmast, and seems during the most of the day to have had the hurricane unabated as to violence. Having no wind marked we can only place the centre near to her supposed position, and as the *Loo Choo* did not begin to feel

* 5° to 25 S. and 75° to 105 East.

† This coalition of storms has been distinctly and repeatedly observed in the case of hail-storms. See Quarterly Journal of Science for 1829, pp. 214, 215. *Count de Tristan on the Progress of Storms.*

the gale before midnight and had to cut away her mainmast on the 30th at 1 p. m. close to, but to the West of the centre, we may say with much probability that the two were the same storm, and that like the *Orient's* it was moving slowly down, to the South a little Easterly, without increasing much if at all in size.

On the 30th March, we have the *Orient* with the wind veering to N. W. and moderating to noon, when it became fine, hence we conclude that her storm had either broken up or moved away from her; and I have thus marked no circle for it on this day. The *Dusquesne* and *Duncan* had also both fine weather on this day.

We have thus only the *Loo Choo's* hurricane dismasting her with the wind about South, and the *Maria Somes* with her part of it subsiding rapidly and the Barometer rising fast. Having also her Latitude for this day and the *Loo Choo's* position well determined we are enabled to say with tolerable certainty that the diameter of the *Maria Somes'* hurricane did not much exceed 120 miles, which is that which I have assigned to it on this day, and it must either have been of small extent or moving very rapidly,* for at 5 p. m. it was quite moderate with her.

The rates at which these different storms travelled appears to have been as follows :—

Orient's Hurricane

for the 24 hours.

Per hour.

† 25th to 26th,.....	.....	.....	15 $\frac{1}{3}$?
26th to 27th, W. S. W.	64 miles,.....	.....	2.7
27th to 28th, S. W. b. S. $\frac{1}{2}$ S.	74 .....	.....	3.0
28th to 29th, S. b. W. $\frac{3}{4}$ W..	130 .....	.....	5.5

Grand Dusquesne's Hurricane.

27th to 28th, S. W. b. W. $\frac{1}{4}$ W.	122 .....	.....	5.0
28th to 29th, S. b. W. $\frac{1}{4}$ W..	108 .....	.....	4.5

Maria Somes' Hurricane.

28th to 29th, S. b. W. $\frac{1}{4}$ W..	42 .....	.....	1.8
29th to 30th, S. b. W.	102 .....	.....	4.5

The mean track of the three storms is S. W. $\frac{1}{2}$ S. and their mean rate of travelling excluding the first day of the *Orient's* storm 3.9 miles per hour.

* Or contracting, or *lifting up* which there is reason to suppose may be different modes by which hurricanes terminate. *Sailor's Horn Book*, p. 261.

† Uncertain.

At first sight these appear too capricious to be entitled to much confidence, but we are fortunately able to corroborate them by our former knowledge of this peculiarity of the hurricanes of this tract. It will be seen by reference to the eleventh of these Memoirs, *Journal*, Vol. XV. p. 69, that the hurricane of November 1843, in this same latitude, and in from 82° to 88° East, and which has been traced by a sufficient number of Logs to entitle us to consider its track and rates of travelling as nearly correct, moved as follows:—

Hurricane of Nov. 1843.

	<i>for the 24 hours.</i>	<i>Per hour.</i>
1st day.....	60 miles.....	2.5
2nd ditto	32	1.3
3rd ditto	135	5.6
4th ditto	47	2.0
5th ditto	57	2.4

Evidently showing that tendency in all the storms in this dangerous locality which Colonel Reid so sagaciously conjectured from a consideration of the *Albion's* hurricane of 1809.

"Not to be moving onward with the regular progression of those which have been traced on the charts, but more to resemble the commencement of a whirlwind floating with an irregular motion, as waterspouts do in calm weather."

I have slightly altered this quotation from Col. Reid's *Law of Storms* 2d Edition, p. 241. It will be recollectcd that the *Albion's* was a hurricane of terrific violence, in which three East Indiamen, out of a fleet of nine, foundered. *Did they meet with a whirlwind like the Duncan's?*

Be this as it may, the singular occurrence of *three* hurricanes together within so confined a space, and the danger of one storm so heightened by the awful phenomenon above alluded to,* shows clearly that our cautions for the last seven years to mariners in crossing this tract are by no means superfluous. It was however so far providential that they did occur at the same time that, for the *Maria Somes*, *Loo Choo* and *Grand Dusquesne*, it might have been destruction to have fallen in with a second

* The position of which I have marked on the *Duncan's* track, close to Noon of the 29th. It may have been the joint effect of the *Maria Somes'* hurricane which was the nearest, and that of the *Duncan's*, and this whether an electrical or dynamical phenomenon. Mr. Redfield in his recent memoir on the Cuba Hurricane of 1846 p. 94 mentions an instance of a local tornado of resistless violence occurring in the midst of it, and he states that in America and the West Indies they are not unfrequent.

hurricane, which they might have done if the storms had succeeded each other at intervals of a day or two.

I should perhaps explain that I have not noticed in these remarks the run of the Cove across the middle of the space which a day or two afterwards was occupied by the hurricanes, because it is doubtful if her gale at S. E. was any thing more than a stormy trade. It might however have been the commencement of the "dreadful weather," mentioned in the newspaper extract quoted at p. 523 as prevailing from the 24th to the 31st, and as we frequently obtain in the course of time additional documents I have thought it right to give this one as a record.

MISCELLANEOUS.

The Liquidamber tree of the Tenasserim Provinces.—By the Rev. F. MASON.

"Did you ever see in this country the tree which produces the Balsam of Tolu?" a gentleman once asked the writer. "I never did," was the reply. "I have one in my compound," he continued; but unfortunately his compound was two hundred miles distant. Years passed away and I found myself beneath this tree in flower, and soon discovered that it was not *Myrospermum toluiferum*, but *Liquidamber altingia*; and that it produced not Balsam of Tolu, but liquid Storax.

The tree is indigenous on the coast, and in some sections is quite abundant. A considerable stream in the Province of Mergui derives its name from this tree, in consequence of its growing so thick on its banks. It seems to have escaped the notice of Dr. Helfer, for, if I recollect right, it is not once alluded to in any of his reports, nor has it ever been brought to notice by any one; if we except a Catholic Priest, a resident of Rangoon, who has introduced it in a little Burmese medical treatise that was lithographed a few years ago by Col. Burney, who took a lithographic press with him into Burmah.

The Padre seems however to have been ignorant of Botany, for he describes it as the tree which produces the Balsam of Peru (*Myrospermum Peruiferum*) and which belongs to a different natural family. The medicinal properties of their exudations too, are materially different. Liquid storax, the production of this tree, is described by Lindley merely as "A stimulating expectorant substance—influencing the

mucus membranes, especially that which lines the air passages." The writer of the Burmese medical treatise recommends the exude of the tree for the usual purposes to which the Balsam of Peru is applied, under the delusion that it is the same substance!

Here is a fine illustration of the fallacies of medicine. It is probable that this substance has been used in all the various cases mentioned by the author, and quite as much good done, and as wonderful cures effected, as if he had used the veritable Balsam of Peru. And the same glorious effects are still being produced, for the book is in the hands of many natives and is highly valued, but no part more so than this, because it points them to a production of the country, while most of the medicines mentioned are foreign productions.

It seems to me that our liquid storax might be made an article of commerce, but I know not how it sells in the market.

The tree is called by the Burmans နန္တရှုံး Nan-ta-rouk.

Note on a method of determining the Neutral Point of Barometers having small circular cisterns.—By Capt. J. C. HANNYNGTON, 24th B. N. I. Assistant Commissioner, Chota Nagpore.

1. For any barometer having a circular cistern of small diameter, let h be the approximate height of the column of mercury, $\frac{1}{c}$ the ratio of the capacities of the tube and cistern, P the neutral point, and H the true height, then,

$$H = h \pm \left(\frac{P - h}{c} \right).$$

2. When two or more barometers are compared together side by side, the vacuum in each being equally perfect, it is for practical purposes assumed that after applying the small corrections for capillary repulsion, and difference of temperature, the actual heights of the several columns are equal.

3. Therefore if P the neutral point of the instrument from which h is derived, and of which $\frac{1}{c}$ is the ratio of the capacities, be unknown; H may be obtained by simultaneous observations with another barometer, and this independent value of H may be put in the above equation, which will still remain true.

4. Hence it will follow that,

1st, When h is greater than H ; $P = h + (h - H) c$;

2nd, When h is less than H , $P = h - (H - h) c$.

5. Both cases are included in the following rule.

Rule. Multiply the difference between the true height of the mercury column (ascertained by a correct barometer) and the approximate height as found by the instrument of which the neutral point is sought, by the reciprocal of the proper fraction expressing the ratio of the capacities of the latter instrument; the product being added to or subtracted from the approximate height, according as that is greater or less than the true height, will give the neutral point that was required.

Example.

	Barometer.	Temp.
Standard Instrument,	29.979	85
Barometer No. 36,	29.970	91
Barometer No. 36 observed	29.970	
Capillarity,	+.029	
Correction for +6° temp.	-.018	} +0.011
Approximate height,.....	29.981	
True height by Standard,	29.979	
Difference	0.002	
No. 36, Capacities $\frac{1}{48}$; Reciprocal,.....	48	
Product	0.096	
Approximate height,	29.981	
Neutral point of No. 36,.....	30.077	

6. The Neutral point of No. 36, as marked by the maker, is 30.075. The result here shown is a proof of the correctness of both the instruments used. The standard is that in the Surveyor General's office; No. 36 is a portable barometer by Newman, belonging to Colonel Ouseley.

7. As the Neutral point of portable barometers is liable to material alteration by the accidental escape of a small portion of mercury from the cistern, the above simple rule may be found useful, either for verification or discovery.

Proposed Archaeological Investigation.

The discovery and publication of all the existing remains of architecture and sculpture, with coins and inscriptions, would throw more light on the ancient history of India, both public and domestic, than the printing of all the rubbish contained in the 18 Puráñas.

The fact that Buddhism continued to flourish throughout India for many centuries, is to be ascertained from monuments almost alone. Buildings, coins, and inscriptions all point to Buddhistical ascendancy until the attacks of the Musalmáns under Mahomed Ghaznávi. In corroboration of this view we have the direct testimony of several Chinese pilgrims and the explicit statements of the Kashmerian History. But in none of the Hindu books is there any allusion to Buddhism. The institutes of Menú the Ramayana, the Mahabharata, and the fabulous Puranas are all silent regarding Buddhism, as if that religion had never flourished in India. The publication of all the existing remains of Buddhism in the shape of architecture, sculpture, coins and inscriptions would I conceive be equally valuable for the illustration of the history of India, both religious and political, with the printing of the Vedas and Puranas. It is a duty which the Government owe to the country. The remains of architecture and sculpture are daily deteriorating, and inscriptions are broken or defaced; the sooner therefore that steps are taken for their preservation, the more numerous and consequently the more valuable these remains will be.

As Pliny in his Eastern Geography follows the route of Alexander, so an enquirer into Indian archæology, should tread in the footsteps of the Chinese pilgrims Hwan Thsang and Fa hian. Guided by them he would visit Thanesar and Delhi—Behat and Sadhora, Mathura and Samkassa, Kanoj and Ajudhya, Kapila and Kusinagara, Kasi and Pataliputra, Gaya and Rajagriha. All these places were esteemed holy by the Buddhists, and possessed stupas built over relics of Sákya or of other Buddhas. But there are other places in Central India that should be carefully examined, of which Kasurata, the capital of the ancient kingdom of Chichavati, together with Kalinjar, which is mentioned in the Vedas, and Ujain the Ozéne of the Greeks, are the principal. The whole of Malwa, however, is full of ruins, both Bráhmaical and Buddhistical. In fact Hwan Thsang remarks that there were two

districts in India famous for religion—Magadha in the N. E. and Malwa in the S. W.

To conduct these researches in the most efficient manner would require the services of at least two persons, one of whom should be a good draftsman. But the one to whose judgment the selection of objects for preservation is to be confided should have a knowledge of the ancient history of India. He should be conversant with the sculptured forms and religious practices of the present day, and with the discoveries made by Prinsep and others in Indian Palaeography and Numismatology; without such a head to guide the selection of objects worthy of preservation the labor of the most perfect draftsman would be thrown away.

A. CUNNINGHAM.

Extract of a letter from Capt. KITTOE.

"As the month is drawing to a close I may as well give you a brief sketch of my doings since my last, which I have given extracts of in the March No. of the Journal.

My last left me at Nawada about to visit Behar, &c. &c. I first went to Giriyek, and on my way visited the hot springs called Agnidhara. There are four springs, all very weak; the temperature in one was 125°. There is only one cistern here, much neglected; there have been temples in former times of which traces remain, also of many buildings. I next went to Buddha's cave, called Gadadwar, or as I explained it in my notes on Fa Hian's route, "Gridha Dwara." I examined both caves thoroughly except that I could not get to the end of the passage, which is insufferably hot and stinking from the bats; there have been several cavities originally made use of by ascetics. They are natural curiosities which have perhaps been slightly enlarged by picking out loose fragments. I am satisfied of this, as there are no tool marks which in a bad light I had imagined I saw last year. The rock is too hard to allow of it.

I could have wished to have been able to devote more time to Giriyek, but the exertion of climbing these barren rocks at this season of the year is too great to be repeated. I climbed the hill, to the tower called Jarasandha's; it is decidedly a chaitya, to the south of which, on the

highest peak, has been one much larger, and no doubt that called by Fa Hian "the throne of the Buddhas." I am now able to explain why the thousands of "grottos" are not to be found ; "grotto" (grotte) is the proper definition for the residences of the Rishis, not "caves;" the whole eastern face of the hill and in other spots, there have apparently been numerous little chambers of brick and of stone from the water's edge to the top, not one of which is now entire ; there have been bowers and larger buildings also.

From Giriyek I went to the Jain fine, called Pawa-puri and Pokar-puri ; I am satisfied that this is a very modern work, not earlier than the reign of Shah Jehan ; an inscription indeed tells you as much. The village of Pawa is 2 miles north ; it has no mark of great antiquity ; it was here Mahavir, the 24th Jain Tirhankar, was born.

From Pawa Puri I went eastward to the village called Gusserawa, where there are many idols, some extensive mounds (sites of temples) and several tanks. The idols belong to the later period of Buddhism. Here I was fortunate enough to get possession of a beautifully cut inscription which has lately been dug out of the mound ; I purchased it for three rupees, and after taking correct fac similes in triplicate, I had it fixed into the outer wall of a modern temple in a niche. The inscription records the adoption, by a young bráhmin, of the Buddhist faith, and his subsequent admission to great honors as a holy personage. The name of Deva Pála as ruling prince occurs ; he would seem to have been a Buddhist ; this must be Deva Pála of the Bengal kings, who it would seem were rulers of the whole country. The name of Kaniska also occurs, as founder of a Vihara (in the north) ; this Kaniska was the third Tartar prince of that name ruling in Cashmere, who, we are told in the Raja Taringini, restored Buddhism (see Prinsep's Useful Tables). Dr. Ballantyne, Principal of the Benares College, has prepared a careful and elegant translation, which, with a transcript of the original Sanskrit, I send with this letter. The character is an early type of the Goura or Kutila, and very distinct. The inscription is worthy of patient investigation, for there are several doubtful passages, and the pundits are by no means unanimous in their reading.

From Guserawa I went to Uphsur, the spot I paid a hurried visit to last year. I put a number of workmen to clear the earth and rubbish in which the great image of Varsha was buried ; I was

repaid for the expense and labour, for a more curious and interesting piece of sculpture could not well be found. The figure of the goddess Prithee is a fine specimen of art ; the group represents Vishnu as the Sweta Varáha, with the holy men escaping the deluge in his bristles, and Prithee raised on his tusk ; Schesa appears on his right, half man half snake. On the hog's back is a rock on which is a Schesnág and remains of figures, apparently Maha Deva and Parvati. On the tip of the tongue Buddha is seated. The figure is about nine feet high and as many in length ; the stone is a compact sandstone, the same as that of the Asoka pillars, and is one single block ; I have taken drawings and made a careful copy of the inscription which had received furthur injury since I saw it last year, and have brought it away to re-examine it, and to restore as much as possible before having it fixed in a pedestal near the Varáha. This inscription is extremely curious, and had it not been for the centre portion being ground out by the sharpening of tools, it would have proved the most useful and interesting relic next to the Asoka inscriptions that we have ever become possessed of ; as far as I have transcribed it, the pundit has explained the meaning ; there are six princes named of the Gupta Dynasty, mostly names new to us and two are to be found in the Raja Taringini. Hushka Deva is one : the writer of the inscription records his having met in battle a large army of Huns whom he defeated, and here the inscription is defaced ; allusion is made to the great tank which still exists at the N. E. corner of the village ; the Varáha is not mentioned. It was very near this place that the coins which were lately sent to the Society from Monghyr were found. Leaving (Uphsah) and about one mile to the north washed on its western face by the Sikri river, is an isolated rock about $\frac{3}{4}$ of a mile in circumference, or less ; on this have been fortifications and several large chaityas, of which there are clear traces ; there are several mutilated figures of Buddha of colossal dimensions ; there is a small village under the north face ; I could glean no tradition concerning this curious place. From hence I proceeded to Tettarawa, where there have been many chaityas and viharas in former times, but of the later periods of Buddhism. There are a great many images scattered about in all directions, one in particular of Buddha, on the site of a chaitya beside a large tank, is of gigantic size and finely executed ; a terrace has lately been built under it and behind it it is worshipped as Bhaṭṭab.

I found the people excavating, for bricks they said, but I believe, in search of treasure, or of metal idols. I descended into one excavation and removed a huge block of stone in which there were niches which had evidently contained relics embedded in some ruinous substance that had been partly charred by the fire, which had evidently destroyed the building, for upon removing the stone which was much split I found a chamber filled with ashes, and burnt bones, and I was told that every place exhibited the same marks of destruction. From this village I proceeded to Behar, where I passed several days. The Mahomedans have destroyed every thing, even the stone pillar on which there are inscriptions in the Gupta, as well as Chinese looking characters. These I copied, and the former have been made out as satisfactorily as their mutilated condition will admit of ; one is nearly verbatim the same as that of the Bhitar pillar, translated by Prinsep ; the other appears to relate to the victory of Chandra Gupta over the Nandas, but it is very imperfect. Surely these cannot be the same inscriptions sent by Mr. Ravenshaw, and published by Mr. Torrens in the 9th volume, (I think) of the Journal, with an alphabet ? You will have an opportunity of comparing notes when my official report and journal is submitted to government. I visited "the little hill" of Fa Hian ; on this are numerous tombs of Mussulmans and the massive Mausoleum of Mulik ben Ibraheem, who flourished during the reign of the first Feroz Afghaan of Dehli ; these tombs are all constructed on the sites of Buddhist buildings no doubt, and with their materials. The citadel of Behar is evidently an unfinished Mahomedan structure and decidedly not Hindu, as conjectured by Buchanan and asserted by the people ; the place has been nothing more than what the name implies, ~~q~~ z. a Vihara, or perhaps many Viharas and Chaityas. There are a few very beautiful fragments here and there. From Behar I went to Bargaon ; this must have been a famous place, and I consider it to be the "Na lo" of Fa Hian ; there are some splendid tanks some half a mile or more in length ; there are mounds innumerable and broken idols also, they are all of the later times ; some are half Vishnuvite half Buddhist, some are Surrowuc Jain, and some of the Naga type. There are linga and several figures of Durga slaying Mohesh ; there is a Jain temple in the village in the same state as those at Pawa Puri, it is to the south of the tanks that there are the greatest masses of ruins ; there appears to

have been five large towers or temples, one or more of the mounds should be excavated. They appear to have had chambers vaulted in a very clever though primitive manner, which is termed "Vang," वंग, in the Gussurawa inscription. The bricks are overlapped like an inverted staircase till they meet at a point in the centre.

I observed a chamber that had been lately excavated, from which ashes, charcoal and bones were cleared in large quantities again, showing the place had been destroyed by fire; weapons are occasionally found among the ashes.

From Bargaon I went to Raja Griha; I found nothing new there except the remains of an ancient temple to Maha Deva on the crest of one of the hills, called Abhaigiri; I saw remains of small towers on this hill, but the Jains have appropriated every site and built very indifferent temples on them. I took a bird's eye sketch of the town of Raja Griha; the tower at the western gate has evidently been purposely destroyed and excavated so that to renew the operation would be fruitless. I heard of the ruins of a temple some miles off in one of the recesses of the hills, but the heat prevented my visiting it because I could not go by night through the thick thorny jungle; it is said to have been a brick building. I had been daily suffering from exposure and was too unwell to prolong my tour, so I returned to Gaya, and after fruitless attempts to get the Gayawals to allow me to copy those inscriptions that yet remained to be done, I broke up my camp, first of all arranging for the despatch of my collection of sculptures.

The day before leaving Gaya I went to Buddha Gaya to return the visit paid me by my friend the Mohunt; I here saw the inscribed slab which is used as a door stop; it is uninjured and the Mohunt has promised to remove it and send it to me; it is Buddhist and of a later date than that of Gassurawa. I returned to Benares by dwak, and thus ended my first *official* tour as Archaeologist for 1848. My next must be to Gorakpur and thence to Patna to explore the many sites of cities in that direction.

I have now given you a tolerable idea of my doings; for more minute particulars you must wait for my official report and drawings.

*Hindi and Urdú Hindi Taskiras.**

Letter from F. Edward Hall, Esq. to the Senior Secretary, Asiatic Society of Bengal.

Among various works to which I have frequently been desirous of referring, in connection with my Oriental studies, but which I have found our library to be meagrely supplied with, I may mention, in particular, Tazkiras of the Persian, Hindi, and Urdú Hindi poets. These Tazkiras contain biographical notices,—of poets especially,—and selections from their writings. At present I wish to call your attention to those Tazkiras only which have reference to authors that have written in Hindi and Urdú Hindi. The number of works of this description that exists, has not yet been ascertained. M. de Tassy had been able to procure but seven, when he published the first volume of his invaluable “*Histoire de la littérature hindou et hindoustani*,” in 1839. In his preface he gives the names of two more that had reached Europe, but which he had not been able to avail himself of. These were in the collection of the late Sir William Ouseley. Several others are mentioned in the body of his work. His “Additions” will probably furnish the names of some which I am as yet unacquainted with. In an interesting paper in the January number of the “*Nouveau Journal Asiatique*” for 1843, M. de Tassy gives some account of the *Majmā-u-lintikháb* of Sháh Muhammad Kamál, the most voluminous and complete work of its kind that had until then appeared. Capt. Newbold enjoys the credit of having sent the first copy of this work to Europe, and perhaps of being the first European aware of its existence. It was written in 1804-5. Kamál was engaged about twenty years in collecting materials for it, and two more in arranging them. From this compilation the curious discoveries have been made, not only that Sádi wrote in Rekhta, but that a fragment from his pen is the oldest specimen of Urdú Hindi composition extant. Kamál even goes so far as to call Sádi the *inventor of the Rekhta language* (موجد زبان رختہ). The authority which the compiler of the *Majmā-u-lintikháb* adduces for these statements, is the poet Qáim, who died about fifty-five years ago.

* For a resolution passed with reference to this communication, see the *Proceedings of the Society* for April last.

The subjoined list comprises the names of all the Tazkiras of Hindí and Urdú Hindí writers, that I have anywhere seen mentioned. Nos. 4, 22, and 23 are Anthologies. Works of this description are often useful in verifying extracts found in Tazkiras. A small portion only of the first Anthology just referred to, is devoted to the poetry of the vernacular language of Hindústán; and the same may be said of the Tazkira of Abú Tálib. These small portions are, however, valuable.

I am unable at present to say whether No. 11 is a Persian, or a Hindí Urdú Tazkira, or a compound of both; and I am in the same doubt with regard to several others whose names I have not given. A number of these, there are strong reasons to suppose, treat, in good part, of writers of the vulgar tongue.

If encouragement be offered to my present project with reference to Hindí and Urdú Hindí Tazkiras, I may on some future occasion prepare a list of Tazkiras containing memoirs of natives of India that have written in Persian. Nearly all of the Urdú Hindí authors of celebrity, and very many of inferior rank, have written more or less in the language of Háfiz and Firdausí. Works of the class just mentioned must, consequently, in so far as they treat of Indian writers, possess almost equal importance with Hindí and Urdú Hindí Tazkiras, strictly so called. Biographies of this description are very numerous. A formidable list might be culled from Mr. Bland's searching article on the lives of the Persian poets, published last year in the Journal of the Royal Asiatic Society.

1. *Tazkira-i Shuqrá-e Hindí*, by Ghulám-i Hamdání Mushafí.
2. *Tazkira-i Shuqrá-e Hindí*, by Fath Álí Khán Husainí Gurdaizí.*
3. *Gulzár-i Ibráhím*, by Nawwáb Álí Ibráhím Khán.
4. *Guldasta-i Nashát*, by Mannú Lál Láhorí.
5. *Díwán-i Jahán*, by Bení Náráyan† Jahán Láhorí.
6. *Nikát-u-shshuará*, by Mír Muhammad Taqí.
7. *Gulshan-i Hind*, by Mirzá Álí Lutf.

* In the older of the two MSS. of this Tazkira that once belonged to the library of the College of Fort William, which is now in my possession, I find كرويدن instead of گرویدن. But I find no such place on the maps.

† This is the orthography which this writer uses in his Chahár Gulshan, in preference to the vulgar corruption, Náráyan.

8. *Majmā-u-lintikháb*, by Sháh Muhammad Kamál.
9. *Gulshan-i Be-khár*, by Nawwáb Mustafá Kháu Bahádúr Shefta.
10. *Khulásat-u-lafkár*, by Mirzá Abú Tálib Khán.
11. *Tazkira-i Shuařá-e Jahángír Sháhí*.
12. *Tazkira*, by Maulaví Qudrat-u-lláh.
13. *Tazkira*, by Miyán Muhammad Qáim.
14. *Tazkira*, by Mír Muhammad Áli Tarmazi.
15. *Tazkira*, by Ghulám-i IIsaīn Shorish.
16. *Tazkira*, by Mír Ghulám-i Ilaeṣan.
17. *Tazkira*, by Mír Fakhr-u-ddín.
18. *Tazkira*, by Abú-l-Hasan.
19. *Tazkira*, by Mirzá Jawīn Bakht Jahándár Sháh.
20. *Tazkira*, by Imám Bakhsh Khár.
21. *Tabkát-i Shuařá-e Hind*, by Maulaví Karím-u-ddín.
22. *Guldasta-i Názīnán*, by the same.
23. *Intikháb-i Dawáwín*, by Maulaví Imám Bakhsh Salhbái.*

Of these works we have the first five only in our library. Five of the twenty-three have been printed, Nos. 4, 9, 21, 22, and 23,—the first in this city, and the rest at Dihli.

The importance of securing as many of these works as possible, without delay, must be obvious to all that are aware of the growing indifference of Musalmáns to perpetuate manuscript writings of other than the very highest importance. Large additions might without doubt be made to M. de Tassy's biographical memoirs, from materials which it is in the power of this Society to collect at a trifling expense. If the Society should see fit to listen favourably to a proposition to this effect, I would cheerfully do everything in my power towards promoting it, by making the requisite investigations. The expense of copying those works of the list above given, which are not in the library, and which there is any ground for expecting to find at present, would not probably exceed two hundred rúpis, and might fall much short of that amount.

* This author has, I believe, compiled a *Tazkira*, in addition to the Anthology above mentioned.

It is a curious fact that No. 21 is little more than a translation of the 1st vol. of M. de Tassy's "Histoire." I have not yet had time fully to ascertain its merits.

For information with regard to the last three works of my list, I am indebted to the ready kindness of F. Taylor, Esq., Officiating Principal of the Dihli College.

Ethnography and Geography of the Sub-Himalayas.

Extract of a letter from B. H. Hodgson, Esq. to Capt. Cunningham, Tibet Mission.

I have now the pleasure to send you the specimen of the Khas language of the eastern Sub-Himalayas, from the Kali to the Tishta. It is, you see, a strangely mongrel tongue in these parts, and I suspect it is not less, but more, so in the western parts, or where you are. There are nevertheless traces of a primitive speech, though the present list of words,—a bad one, by the way—shows them ill. But it must be confessed that (me judice) *no* summary vocabulary *can* exhibit an adequate sample of any language whatever as to whose vocables there be room for doubts looking to proximate tongues. I prefer therefore in such investigations the ample style of research which my Essay on the Kóch, Bódó and Dhimál exhibits, and which I am preparing to send you a copy of, so soon as I can get one duly corrected, for the errors of the press are very many. But, though that be the true model, yet I suspect it will prove too weighty for general adoption, and therefore I am anxious that the more summary one sent you already, and which has now been applied to some 40 tongues, should meet with favour and be the means of enabling us to make a general comparison of all the Aborigines from Cape Comorin to the snows. I have sent copies to Newbold, Elliot of Madras, Jenkins of Assam, Ouseley, Sleeman, your namesake of Bhopál, &c. &c. And I have already got a few and am promised more fillings-up from the several aboriginal tongues within reach of my numerous correspondents. I hope you will not be behind hand but send me the Garhwali and upper Kanáveri, and any other dialects of your parts which are not of Sanscrit origin, whether the people speaking them dwell towards the snows, like the Garhwális, or towards the plains, like the Thárús and Boksars, or midway, like the Helots (Doms) of Kumaon. All and any such (which are clearly not Prákrits, or of the Indo-Germanic stock) will be welcome to me. I have now residing with me Doctor Hooker, an accomplished Botanist and master also of all the other branches of science at all allied to, or calculated to throw light on Botany. He will stay with me for the next 6 months. He is much taken with my skeleton of the physical geo-

graphy of Tibet and the Himalayan region, and he and I want you and other friends in the Norwest, to let us know what you think of this skeleton, and to help us to amend and fill it up before we commence a serious project we have on the tapis, viz. disposing all the plants and animals according to their territorial arrangement, and thus demonstrating its utility and value. Here is the outline:—

Lengthwise division of the Sub-Himálavas into basins—

1. Alpine basin of the Indus.
2. Alpine basin of the Ganges
3. Alpine basin of the Karnáli.
4. Alpine basin of the Gandak.
5. Alpine basin of the Kosi.
6. Alpine basin of the Tishta.
7. Alpine basin of the Dihong.

I suppose this series of basins to be formed by the pre-eminent snowy peaks, and I have perfect proof that such is the fact in Nepal, where Dhoulagiri, Gosainthán and Kanchan form most precise deltizers of the very perfect deltic basins of that part of the mountains. I cannot however so well find deltizing peaks W. and E. of Nepal. I want you to help me in that search, and also to say if you think practical utility would be forwarded by additional basins? and if the physiognomy of the western hills requires or sanctions a separation of the basins of the Sutlej from the Indus, or of the Jamna from the Ganges? Remember however always that though it be interesting to show the *cause* of the series of Sub-Himalayan basins, yet the series may be good though the cause be bad. Therefore look for causative snowy peaks, but don't reject the deltic basins because you find them not, or not all of them, or even some peaks that seem to conflict with the theory. Next we have the transverse or breadthwise division of the Sub-Himálayas into the following series, primarily triple, but in whole quinary, thus:—

Breadthwise climatic division—

		<i>Miles.</i>
1.	Northern region, or Cachár,	30
2.	Central region,.....	30
3.	Lower region,	30

{ Subdivided into Lower
hills, 1—10 }
Forest, 2—10
Tarai, 3—10

Extent,.....Elevation.

- | | | | |
|--------------|---|-------------------|--------------------------|
| 1. 30 miles, | } | Crest of snows to | 16 to 10,000 above sea. |
| 2. 30 miles, | | verge of true | 10 to 3000 above sea. |
| 3. 30 miles, | | plains. | 3000 to 1000* above sea. |

Subdivisions of 3, each 10 miles in extent.

Such is the scheme for giving a convenient nomenclature to the topography of these mountains, based on their true physiognomy and climate. A better judge of its apparent value could not be than Dr. Hooker, and he feels as much confidence as I do, after much examination of maps compared with the results of my personal knowledge, that the apparent and the real values will prove, in this case, one. So that nomenclative convenience will go hand in hand with a solid and considerable accession to physical Geography.

And now my feeble state, the consequence of a severe attack of illness, warns me to pause for the present, though your very interesting letter tempts me to dilate on some of the numerous topics thereof. I can only say at present that I congratulate you on your discoveries.

NOTE.—The Khas are undoubtedly one of the aboriginal tribes of these mountains, however much the traces of their origin may be obscured by intermixture with the Arian Hindus. And accordingly we find the Khas, like the Kirántis, mentioned in the Puráns and in classical authors as barbarian tenants of the Sub-Himalayas. The Khas, however, welcomed the Hindu immigrants into these mountains at a very early period, and soon became so intermixed with the Bráhmanical and Kshatriya tribes (the genuine Arians) that all physical or lingual traces of their aboriginal lineage are now much weakened or obliterated. And as they have become, since the predominance of the Gorkhali dynasty in Nepal, the dominant race in a Hindu kingdom, they are themselves very anxious that those few traces should remain unnoticed. But no one practised in Ethnological researches can fail to discern the aboriginal and Mongolian origin of the Khas in their forms and faces: nor does their language, how much Prákritized soever want some vestiges of that origin, though the following list of words is not happy in the exhibition of them. All Khas gentlemen in Nepal parade a Rajpút origin, and it is no doubt true that by the father's side very

* Assumed plain level. But it varies from 1200 to 250 between N. W. and S. E. extremes. We must take the plain level and correct for it. The elevations, as limits, of course refer to organic life in Zoology and Botany.

many of them are descended from Bráhmans or Kshatriyas of the plains. But their mixed lineage is undoubted, and it is therefore the more remarkable that the rank and privileges of the 2d order of Hinduism have been conceded to them under a strict Hindu regime—a striking proof that Bráhmanism is not the unalterable institute which some Europeans of note have represented it to be. Capt. C. supposes he has discovered many traces of the aboriginal Khas in the Nor-west.

KHAS LANGUAGE.

Arrow,	Kánd,	Leaf,	Pát,	H.
Bird,	Chera,	*H. Light,	Jótí,	S.
Blood,	Rakat,	S. Lightning,	Bajar,	S.
Boat,	Dángá,	Man,	Mánis, Lógnaya,	
Brass,	Písal,	H. Milk,	Dúdo,	H.
Brick,	Inth;	H. Moon,	Chánd, Jún,	
Brother,	Dájú, elder.	B. Mother,	Amma,	
Buffalo,	Bháiss,	H. Mountain,	Dánja,	
Camel,	Unth,	H. Mouth,	Múkh,	H.
Cat,	Biráló,	Name,	Náon,	H.
Cloud,	Mégh,	S. Night,	Rátí,	H.
Copper,	Támbó,	H. Nose,	Náka,	H.
Cotton,	Kápás,	H. Oil,	Téł,	H.
Cow,	Gai,	H. Rain,	Barkhá,	S.
Daughter,	Chóri,	River,	Khóla,	
Day,	Ding;	H. Road,	Bátó,	
Dog,	Kóter,	Salt,	Nún,	H.
Ear,	Kán,	H. Sheep,	Bhérá,	H.
Earth,	Prithivi, Mátí, S.	H. Shoe,	Panai,	
Elephant,	Háthi,	H. Silver,	Chándi,	H.
Eye,	Ankha	H. Sister,	Bahini, Didai,	
Father,	Bábá,	Sky,	Sarg,	S.
Fire,	Agó,	H. Son,	Chórá,	
Fish,	Máchha,	H. Snake,	Sáp,	S. H.
Flower,	Phúl,	H. Snow,	Hyún,	S. H.
Foot,	Górá,	H. Star,	Tárá,	H.
Fort,	Gárh,	H. Stone,	Dhúngá,	
Fruit,	Phal,	Sun,	Súraj,	H.
Goat,	Bóká, (mas.)	Thunder,	Garan gúran,	
Gold,	Sún,	H. Tiger,	Bág,	H.
Grass,	Ghás,	H. Tooth,	Dánt,	H.
Hair,	Raon,	Town,	Sahar, Pers.	
Hand,	Háth,	H. Tree,	Rúkh,	
Head,	Tuu, Tou, Tou ko,	Tribe,	Thar,	
Honey,	Moho,	Village,	Gaoñ,	H.
Horse,	Ghóra,	H. Water,	Páni,	H.
House,	Ghar,	H. Wife,	Jói,	
Husband,	Pói,	Wind,	Batás,	H.
Iron,	Phálám,	Woman,	Swásni,	
King,	Rújah,	H. Wood,	Káth,	S.
Lead,	Sísá,	H. Wool,	Raoý,	

* NOTE.—H. postfixed indicates a Hindi or Urdu origin. S. a Sanscrit one.

North,	Uttar,	S.	Square,	Chár pátya,	
South,	Dakhin,	H.	Straight,	Sojó,	
East,	Púrba,		Sweet,	Míthó,	H.
West,	Paschim,		Then,	Tailé,	
1.	Ek,	S.	There,	Utá,	
2.	Dwi,		Thick,	Mótó,	H.
3.	Tin,		Thin,	Dúbló,	H.
4.	Chár,		Wet,	Bhíjyo, Chísó,	
5.	Pánch,		When,	Jailé,	
6.	Chah,		Red,	Ráto,	S.
7.	Sát,		Yellow,	Pahelo,	H.
8.	Ath,		Blue,	Niló,	S.
9.	Nou,	H.	Green,	Haryo,	H.
10.	Das,		Black,	Káló,	H.
11.	Egáro,		White,	Shétó,	S.
12.	Bárah,		Right,	Dainé,	H.
20.	Bis,		Left,	Détré,	
30.	Tís,		I,	Man,	H.
40.	Chális,		Of me,	Méró,	
50.	Pachás,		To me,	Ma lai,	
100.	Sai,		Me,	Ma lai,	
1000.	Hajár,	Pers.	By me,	Mai lé,	
1st.	Pahila,		We,	Hámi héru,	
2nd.	Dúsrá,		Of us,	Háni héru ko,	
3rd.	Tísra,		H. To us,	Háni* héru lai,	
4th.	Choutha,		Us,	Hámi lai,	
10th.	Dasón,		By us,	Hámi* lé,	
After,	Pachi,		H. Thou,	Ton Tan,	H.
Bad,	Naniko, Ghin lápdo,		Of thee,	Téró,	
Before,	Aghi,		H. To thee,	Ton lai,	
Beneath,	Tala, Múni,		Thee,	Ton lai,	
Broad,	Choura,		H. By thee,	Tain lé,	
Cold,	Chísó,		Ye,	Timi herú,	
Crooked,	Bángó,		Of you,	Timi héru ko,	
Dry,	Súkyo,		H. To you,	Timi héru lai,	
Good,	Niko,		You,	Timi héru lai,	
Hard,	Sáró,		By you,	Timi héru lé,	
Heavy,	Garáng,		He,	U,	II.
Here,	Itá,		Of him,	Uškó,	
High,	Algo,		To him,	Uslai,	
Hot,	Tato,		Him,	Uslai,	
Large,	Thúló,		By him,	Uslé,	
Light,	Halúng,		They,	Uní herú,	
Long,	Lámó,		H. Those,	Tiui héru,	
New,	Naya,		H. Of them,	Uní héru ko,	
Now,	Ailé,		To them,	Uní héru lai,	
Old,	Púrán,		H. Them,	Uní héru lai,	
Quick,	Chándohinya, Chito,		By them,	Uní héru lé,	
Raw,	Káchó,		H. Who,	Jún, Jó,	II.
Ripe,	Pákó,		H. Of whom,	Jas ko,	
Rough,	Khasro,		To whom,	Jas lai,	
Round,	Dallo,		By whom,	Jas lé,	
Slow,	Dhílo,		H. What,	Jyá,	
Small,	Sánú,		Of what,	Jyá ko,	
Smooth,	Masino,† Chillo,		To what,	Jya lai,	
Soft,	Kawala,		By what,	Jyá lé,	

* Pluralizing sign héru ommissible.

† Corruption of Mahín.

This,	Yé,	H. To Hear,	Súnnú,	H.
Of this,	Yés ko,	„ Eat,	Khánú,	H.
To this,	Yés lui,	„ Carry away,	Léjánú,	H.
By this,	Yés lé,	„ Raise,	Uchánu,	
That,	Tyó,	„ Cook,	Pakounú,	H.
To speak,	Kúra garnú,	„ Open,	Ughárnú,	H.
, , Bring,	Lé ánu,	H. „ Weigh,	Jókhnú,	H.
, , Die,	Marnú,	H. „ Bind,	Bándhnú,	H.
, , See,	Hérnú,	„ Cut,	Kátinú,	H.
, , Drink,	Pyúnú,	H. „ Tear,	Chyátnú,	
, , Sit,	Bósnu,	H. „ Wipe,	Póchhnú,	
, , Give,	Dinú,	H. „ Call,	Dáknú,	
, , Be,	Honú,	H. „ Blow,	Phúknú,	
, , Come,	Aunú,	H. „ Fali,	Khasnú,	
, , Go,	Jánú,	H. „ Make,	Banounú,	
, , Stand,	Ubhánú,	„ Clean,	Májhnu,	H.

Meteorological Summary for 1847, by Capt. H. L. THUILLIER, Dep. Surveyor General.

Month.	Monthly Mean Temperature Fahrenheit.			Atmospheric Variations.			Rain Gauge.		Remarks.
	At Sunrise.	At 2h. 40m.	At Sunset.	Extreme Monthly difference at 2-10 compared with 1846.	Extreme monthly difference at 1-11 compared with 1846.	Extreme monthly difference at 1-11 compared with 1846.	Rain in Inches.	Rain in Inches compared with 1846.	
January,	61.0	77.9	73.1	-1.5	30.026	29.907	-.113	0.00	-0.82
February,	61.6	80.5	33.7	+0.4	.038	.916	-.040	0.00	-1.80
March,	71.9	93.2	85.0	+0.6	29.942	.806	+.020	0.00	-2.30
April,	77.7	92.6	85.5	-3.6	.811	.682	-.016	2.33	+1.76
May,	80.0	93.0	85.3	-0.7	.703	.587	-.023	4.79	+2.30
June,	80.8	89.3	84.8	+0.9	.585	.494	-.041	12.01	-0.13
July,	80.2	87.7	83.2	+0.4	.591	.500	-.016	15.69	-4.38
August,	80.5	87.4	84.0	+0.2	.639	.533	+.027	15.09	+1.83
September,	80.2	87.2	84.0	+0.7	.704	.598	+.028	10.95	+0.98
October,	76.0	86.8	82.8	+2.5	.920	.809	+.071	5.86	-4.90
November,	76.8	81.6	77.5	-1.8	30.008	.892	-.003	5.59	+4.85
December,	60.1	76.4	72.8	+0.4	.047	.931	-.035	0.05	-1.47
Mean,	73.9	86.1	77.6	- .9	29.833	29.638	-.012	6.03	-.34
									For 1846.
The greatest height of Barometer on 5th Feb. at 9h. 50m.									30.225
Least ditto on 25th May, at Sunset.									29.356
The greatest height of Thermometer on 26th May, 2h. 40m.									103°
Ditto ditto by Maximum Thermometer,									105°
The least ditto 1st February Sunset.									55°
The hottest month May average Temperature,									90°.53
Coldest, December ditto,									71°.55
Total fall of Rain,									Inches, 72.36

For 1847.

The greatest height of Barometer on 5th Feb. at 9h. 50m. 30.169
 Least ditto on 25th May, at Sunset. 29.310
 The greatest height of Thermometer on 26th May, 2h. 40m. 105°.
 Ditto ditto by Maximum Thermometer, 109°.6
 Ditto, 21st January at Sunrise, 50° 0
 April, average Temperature, 88° 78
 December, 71°.6
 Inches, 76.44

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JUNE, 1848.

At a Meeting of the Asiatic Society held at the Town Hall, Calcutta, on the evening of Wednesday, 7th June, 1848.

J. W. COLVILE, Esq, President, in the Chair,

The proceedings of the last meeting were read.

The monthly accounts and vouchers were laid upon the table.

The following gentlemen, having been duly proposed and seconded at the preceding meeting, were balloted for and elected members of the Society :—

J. Strachey, Esq. C. S.

Geo. Massey, Esq.

Lieut. Albert Austen, H. A.

Wm. Taylor, Esq. C. S.

The names of the following gentlemen were submitted for election at the next meeting :

Dr. J. McLelland, proposed by Mr. J. W. Laidlay, seconded by Dr. Walker.

Lieut. John Harley Maxwell, Bengal Engineers, proposed by Dr. Falconer, seconded by Mr. Laidlay.

Read letters from the following gentlemen withdrawing their names, from the list of members : Rustomjee Cowasjee, Esq., Manickjee Cowasjee, Esq. and Babu Nripendranáth Thakur.

Read a letter from W. Seton Karr, Esq. Under Secretary to the Govt. of Bengal, transmitting copy of a letter from the Secretary at the India House, with enclosure from the Prussian Consul General, announcing the shipment of a box of books presented to the Society.

No. 592.

From the Under Secretary to the Government of Bengal, to the Secretary to the Asiatic Society,

Dated Fort William, the 10th May, 1848.

SIR,—I am directed to transmit for the information of the Asiatic Society the accompanying copy of a letter from the Secretary at the India House, dated the 21st March last, and of its enclosure, from the Prussian Consul General, reporting the shipment per "Mary Anne" of a box of Books addressed to the Vice President and Secretary to the Asiatic Society of Bengal.

2. The Superintendent of Marine has been desired to land and forward to you the box of Books above referred to.

I have, &c.

A. SETON KARR,
Under Secy. to the Govt. of Bengal.

Public Department.

East India House, London, 21st March, 1848.

SIR,—I am commanded by the Court of Directors of the East India Company to transmit you a bill of lading for the Shipment per "Mary Anne" of a box of books addressed to the Vice President and Secretary of the Asiatic Society of Bengal, Calcutta, which the Court have undertaken to forward in compliance with the request contained in a letter from B. Hebeler, Esq. the Prussian Consul General, dated 23d September, 1847, of which a copy is enclosed.

All charges in respect of the box have been defrayed, and it is to be delivered as addressed, *free of expense.*

I have the honor to be, &c.

(Signed) JAMES C. MELVILL, Secy.

*To the Chief Secretary for the time being at Fort William, in Bengal.
Royal Prussian General Consulate, London, (106 Fenchurch Street),*

23d September, 1847.

SIR,—I have the honor to transmit you the accompanying letter received by me from His Excellency Mr. Eichhorn, His Prussian Majesty's Minister for Public Instruction, addressed by Dr. Pertz, Principa! Librarian of the Royal Library at Berlin, to the Vice President and Secretary of the Asiatic Society of Bengal, in Calcutta, and with reference to its contents, I beg to announce the arrival in this port of a case with the sundry valuable works presented to that learned Society.

Awaiting your obliging instructions regarding the transmission of this present to the Royal Asiatic Society in Calcutta,

I have, &c.

(Signed)

B. HEBELEK,

Prussian Consul General.

J. C. Melvill, Esq.

(True Copies)

&c. &c. &c.

W. SETON KARR,

East India House.

Under Secy. to the Govt. of Bengal.

Resolved, that the marked thanks of the Society be returned to the Prussian Government, through the same channel, for this very valuable donation.

From the Secretary to the Superintendent of Marine, forwarding the case of books referred to. (*See Library report.*)

From the same, forwarding copies of letters from Major Jenkins and Mr. Thornton, on the coal formations of Assam, with a map of the road from Nazerah to the coal beds on the Nainsing Naga hills.—(Ordered for publication in the Journal.)

From W. Seton Karr, Esq. Under Secretary to the Government of Bengal, transmitting papers from the Commissioner of Assam relating to some ancient remains of temples in the vicinity of Sudyah, recently visited by Major Hannay.

From Capt. Thuillier, forwarding a Meteorological Summary showing the mean temperature and pressure, and the fall of rain in each month of 1847, and a comparison of the most remarkable atmospheric phenomena during that year and 1846.

From Brigadier Stacy, Meerut, forwarding a drawing by Ensign Anley, of a remarkable insect. (Referred for examination to Mr. Frith.)

From the Rev. W. Keane, giving an account of the process of cure followed by a snake-catcher when wounded by a Cobra, and forwarding for inspection the substance employed.

The substance is evidently nothing but a fragment of charred bone.

From E. S. Brandreth, Esq. enclosing a fac simile of an inscription on the wall of a Jain Temple near Ajmere. The inscription is in Arabic, in Kufic characters, and of no historical importance.

في تولية ابوبكر بن احمد
خالو الهرمي بتاريخ ذي الحجه سنة مئة و سفين و ستمائه

"Under the administration of Abubekr bin Ahmad, Khalu-l-harovi, in the month of Zilhija, and in the year 666."

MY DEAR SIR,—I have the pleasure to enclose the fac-simile of an inscription on the wall of a Jyn temple near Ajmeer. I thought on looking at the writing from below from its position inside the temple itself, that it might throw some light on the early history of the temple, but it appears to be in the Persian language, though no one here understands the character in which it is written, and was probably added by the Mahometans when they converted it into a place of worship for their God. A drawing and description of the temple is given in Tod's history of Rajpootana, but the author does not give any account of its origin, and did not apparently observe the inscription. He makes allusion to what he believed to be Sanskrit letters on the arch in front of the temple, but with the aid of a ladder, I made an examination of the suspicious appearances and found them to be merely ornaments in the sculpture. Among the sacred records in the possession of the Sireepooj of the Suranngrees, I find it stated that the "prutishta," consecration of the temple, took place in S. 717, in the time of the gooroo Padm-chund Chutyara, and that it was built by a Surangee merchant named Beerundas Kala, who spent seven lacs of rupees in its construction. Ala-u-din converted it into a Mahometan place of worship; he took out all the larger images and buried them in the ground, he defaced all the smaller ones that were sculptured on the pillars, and finally built seven magnificent arches in front of the temple. Since his time it has been called the "Arhai din ka jhompra," though for what reason more creditable than that it was built in two days and a half, I could never learn. During the last three or four years several of the images buried by Ala-u-din have been dug up. I suppose you will be able to decipher the inscription in Calcutta, and will then learn whether it possesses any interest.

Your's truly,

E. S. BRANDRETH.

Ajmeer, May 16, 1848.

From J. Strachey, Esq. forwarding the last sheets of his brother, Lieut. Strachey's, Journal of his travels in Tibet.

Also a letter from Mr. Batten on the same subject.

From Capt. Cunningham, forwarding a continuation of his verification of the route of the Chinese Pilgrim Hwan Thsang through Afghanistan and India, during the first half of the 7th century.

Also a memorandum by the same on proposed Archaeological Inves-

tigations. (Published under the Miscellaneous head in the present number.)

The ordinary business of the evening having been disposed of, the Second Report of the Section of Natural History upon Mr. Blyth's application for an increase of salary and a retiring pension, was then read, together with the following resolutions of the Council upon the subject.

Council of the Asiatic Society.

Section of Natural History, 7th June, 1848

The Council of the Asiatic Society submit a report from the Section of Natural History on Mr. Blyth's reply to the former Report made by the Section on Mr. Blyth's application for an increase of salary and a retiring pension.

The Council having perused with extreme care the whole of the statements made by Mr. Blyth on the one hand and the Section of Natural History on the other—deem it now their duty to propose,

1st.—That the Report now made by the Section of Natural History be received, read and laid upon the table.

2d.—That the Society must decline to forward or support the application of Mr. Blyth to the Court of Directors for an increase of salary or a retiring pension.

3d.—That the Society cannot acquit the Curator of serious neglect of duty in permitting the collections of shells, fossils and insects, to fall into the state of dilapidation and decay in which the same are now found to be.

4th.—That the Section of Natural History be requested to adopt measures for the restoration and re-arrangement of these collections.

5th.—That the documents laid before the Council during this enquiry and by them submitted to general meetings, be printed in a separate shape and circulated to the members generally.

6th.—That the thanks of the Society be voted to the Section of Natural History for the service they have rendered to the Society by their investigation of and reports upon the manner in which the duties of the Zoological Curator have been discharged.

W. B. O'SHAUGHNESSY, Secy.

The first of these resolutions was adopted by the meeting. On the second being put from the chair, Mr. Newmarch proposed as an amendment,

That the report now received and read, together with the minutes of reference to the Zoological Section and their original report thereon,

and Mr. Blyth's reply, be printed and circulated to the members of the Society, and that the questions thereby raised be reserved for consideration at the next monthly meeting.

The amendment being put and carried, the meeting adjourned.

Certified to be a true Report,

JAMES WM. COLVILE *President.*
J. W. LAIDLAY, *Sec.* -

LIRRARY.

The following books have been received since the last meeting:—

Presented.

Rgya Tel'er Rol Pa, ou Développement des Jeux, contenant l'Histoire du Bouddha Cakya-Mouni, traduit sur la version Tibétaine du Bkah Hgyour, et revu sur l'original Sanscrit par PH. Ed. Foucaux. Premiere Partie.—Texte Tibétan.—**BY THE EDITOR.**

Verzeichniss der Chinesischen und Mandschu-Tungusischen Bücher und Handschriften der Königlichen Bibliothek zu Berlin. Von Dr. Wilhelm Schott.—**BY THE ROYAL ACADEMY OF BERLIN.**

Lucernæ veterum Sepulchrales Iconicæ, ex Cavernis Romæ subterraneis collectæ et editæ a Petro Sancti Bartoli, cum observationibus J. Petri Bellorii.—**BY THE SAME.**

Hán Tsú Sy y Poú, ou Supplement au Dictionnaire Chinois—Latin du P. Basile de Glemona. Publié par Jules Klaproth.—**BY THE SAME.**

Chrestomathie Mandchou, ou Recueil de Textes Mandchou, destiné aux Personnes qui veulent s'occuper de l'étude de cette langue; par M. Jules Klaproth.—**BY THE SAME.**

Über Inhalt und Vortrag, Entstehung und Schicksale des Königlichen Buchs, eines Werks von der Regierungskunst, als Ankündigung einer Uebersetzung nebst Probe aus dem Türkisch-Persisch-Arabischen des Wuassi Aly Dschelebi von Heinrich F. von Diez.—**BY THE SAME.**

Ermahnung au Istambol oder Strafgedicht des Türkischen Dichters Uweissi über die Ausartung der Osmanen. Uebersetzt und erläutert, nebst dem Türkischen Text, von Heinrich F. von Diez.—**BY THE SAME.**

Index Librorum Manuscriptorum et Impressorum quibus Bibliotheca Regia Berolinensis aucta est anno 1835 to 1839, 4 vols.—**BY THE SAME.**

Numismatum Modernorum Cimeliarchii Regio-Electoralis Brandenburgici Sectio Prima, continens Numismata Pontificium Romanorum, Aliorumque Ecclesiasticorum Rariora et Elegantiora; Ære expressa et Dialogo illustrata à Laurentio Begero.—**BY THE SAME.**

Ulysses Sirenes Prætervectus, ex delineatione Pighiana, subjectis aliis quibusdam de Ulysse Antiquitatibus, dialogo illustratus à L. Begero.—BY THE SAME.

Poenæ Infernales Ixionis, Sisyphi, Oeni, et Danaidum, ex delineatione Pighiana desumptæ, et Dialogo illustratæ, a L. Begero.—BY THE SAME.

Regum et Imperatorum Romanorum Numismata Aurea, Argentea, Ærea, a Romulo et C. Jul. Cæsare usque ad Justinianum Aug. Cura et impensis Illustrissimi et excellentissimi Herois, Caroli, Ducis Crociaci et Arschotani, S. Rom. Imp. Principis, ord. Aurei velleris equitis, Belgæ, &c, à L. Begero.—BY THE SAME.

Verzeichniß der Chinesischen und Mandshuischen Bücher und Handschriften der Koniglichen Bibliothek zu Berlin, verfaßt von M. Jules Klaproth.—BY THE SAME.

Denkwürdigkeiten von Asien in Künsten und Wissenschaften, Sitten, Gebräuchen und Alterthümern, Religion und Regierungsverfassung; aus Handschriften und eigenen Erfahrungen gesammelt von H. F. von Diez, (2 vols).—BY THE SAME.

Buch des Kabus oder Lehren des Persischen Königs Kjekjawas für seinen Sohn Ghilan Schach.—BY THE SAME.

Index Librorum ad Celebranda Sacra Sacularia Reformationis Ecclesiasticæ annis 1817 et 1819 cum in Germania tum extra Germaniam Vulgatorum, quos Bibliotheca Regia Berolinensis ad hunc usqne diem comparavit.—BY THE SAME.

Entwürfe und Studien eines Niederländischen Meisters aus dem XV. Jahrhundert.

Corpus Inscriptionum Græcarum, 3 vols.—BY THE SAME.

Aristoteles Latine Interpretibus Variis.—BY THE SAME.

Scholia in Aristolelem, colligit Christianus Augustus Brandis.—BY THE SAME.

Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin, Annis 1822 to 1844, 27 Vols.—BY THE SAME.

Annales des Sciences Physiques et Naturelles, d'Agriculture, et d'Industrie. Tome IX.—BY THE SOCIETE' ROYALE D'AGRICULTURE, PARIS.

Upadesbaka, No. 17.—BY THE EDITOR.

The Calcutta Christian Observer, Nos. 192-3.—BY THE EDITORS.

The Oriental Baptist, No. 18.—BY THE EDITOR.

Transactions of the Zoological Society of London, Vol. III. part IV.—BY THE ZOOLOGICAL SOCIETY OF LONDON.

Reports of the Council and Auditors of the Zoological Society of London for the year 1847.—BY THE SAME.

A List of the Fellows and Honorary Foreign and Corresponding members of the Zoological Society of London 1847.—BY THE SAME.

Moore's Indian Appeal Cases, Vol. III. part II.—BY THE EDITOR.

Journal of the Indian Archipelago, Vol. II. No. IV.—BY THE EDITOR.

Journal of the Royal Geographical Society of London, Vol. VII. part II.—
BY THE SOCIETY.

Meteorological Register kept at the Surveyor General's Office, Calcutta,
for the month of April, 1848.—BY THE OFFICIATING DEPUTY SURVEYOR
GENERAL.

Nityadharmanurangicá, Nos. 58-9.—BY THE EDITOR.

Tatwabodhini Patriá, No. 57.—BY THE TATWOBODHINI SABHA.

Molárehul Azkiá Ohaddiatul Ahabba.—BY MOULUVI REZA HOSSUN
KHAN.

Exchanged.

The London, Edinburgh and Dublin Philosophical Magazine, Nos. 213-14

Journal Asiatique, Nos. 48 to 51.

The Quarterly Journal of the Geological Society of London, No. 13.

The Athenæum, Nos. 1058 and 1061 to 64.

Purchased.

Comptes Rendus Hebdomédaires des Séances de l'Académie des Sciences,
Tom. XXV. No. 26.

The North British Review, No. XVI.

The Annals and Magazine of Natural History, Nos. 2-3, N. S. V.

Journal des Savants for Dec. 1841.

Fauna Antiqua Sivalensis,—being the Fossil Zoology of the Sewalik Hills.
By Dr. H. Falconer, and Capt. P. S. Cautley, Parts II. to VI. (three copies).

The Edinburgh Review, No. 176.

Report of the Curator, Museum Economic Geology, for the Month of May.

We have very little in the way of contributions to announce for this month,
and the closing of the Museum, with all the inconveniences necessarily
attendant thereupon, have confined me to the laboratory, in which however
my work is not far enough advanced for report.

In despatching for Major Jenkins a box of his Assam serpentines which
were at his request exhibited at the Society's meeting, I have added also, as
requested by him (and as an instalment only of the large debt we owe to so
liberal a contributor) eight specimens of various Indian minerals, &c.

From Mr. C. McLeod, we have received a collection of sundry minerals
with a few fossils.

I have some other contributions on hand but cannot yet report upon them.

Reports of Curator, Zoological Department.

For March Meeting, 1848.

The following Donations have been received.

1. Walter Elliot, Esq. Madras C. S. A living specimen of the *Cheetah*, (or Hunting Leopard,) *Felis jubata*: a species, remarks Mr. Elliot, which is "common, though not plentiful, throughout Southern India, and which I have myself met with in the wild state, though I have never actually killed one.* This one is quite tame, and may be handled with perfect freedom. I let him loose in my stables, and he plays about with the dogs and ~~refuses~~ himself to be tied up again without difficulty."†

2. Mr. H. Greenfield, Akra farm. A very fine ad. li male of the common Bengal Otter, *Lutra chinensis et indica*, Gray, as now identified by that systematist.—*L. tarayensis*, Hodgson.

3. Capt. Phayre, Maulmein. A specimen in spirit of *Sciurus Barba nobis*, XVI, 875: and two skins of *Rhizomys sumatrensis*, (Raffles, v. *cineraceus*, McClelland), adult and young, sent in weak spirit and the hair coming off with the cuticle, so that the skulls only have been retained for the museum.

4. Beboo Rajendro Mukherjee. A dead Tragopan (*Satyrus cornuta*), young male.

5. Mr. E. Lindstedt. A dead white-handed Gibbon (*Hylobates lar*), from Malacca. This animal had been living for some months on the Society's premises; and the contrast which it offered with *H. hoolock*, was very remarkable. The body is proportionally much shorter; and it was quite incapable of walking in the erect attitude commonly assumed by *H. hoolock*, always creeping forward when on the ground in a crouching position. Both skin and skeleton have been preserved.

6. J. Pybus, Esq. Carcass of a Bear (*Ursus labiatus*); now mounted in the museum.

7. Mr. Robt. J. Rose, of the Police. A small *Crocodilus biporcatus*, 6 ft. long, taken out of the Wellington tank, Calcutta.

8. Major Brodie, 5th N. I. Two fine Buffalo skulls, with large horns; from Assam.

9. Robt. Ince, Esq., Chittagong. A few insects in spirit.

10. F. Skipwith, Esq., C. S., Chittagong. Two bird-skins.

11. Mr. Birch, of the Pilot service. A few common fresh-water shells from the Soonderbunds.

12. Mr. Templeton, of the museum. Skin of *Cuculus innotatus*, juv. Australia.

E. BLYTH.

For April Meeting, 1848.

1. Rája Buddenath Roy. A dead female Cassowary, now mounted in the museum.

2. G. T. Lushington, Esq., C. S., Almora. Two fine skins of the Goral.

3. Mr. J. Bell, of the Preventive Service. A brown variety of the Black Rat (*Mus rattus*, L.); dead.

* Since writing the note to Vol. XVI, 1272, I have learned from Dr. R. Templeton, that the Leopard, and not *F. jubata*, is the so called "Tiger" of Ceylon.

† Mr. Elliot adds—"I had three kittens of *Felis rubiginosa* for you, but unluckily, they all died. With reference to your Report in the March Journal (p. 247 ante), I may remark on the subject of Cats that I recently met with an undoubted hybrid between *F. chaus* and the domestic Cat. The Lynx-like tail, the bars on the thighs, the patches of tawny-chaus colour and fur, with the more variegated colour and white patches of the domestic kind, were distinct and patent to the most careless observer."

4. Baboo Rajendro Mullick. Two dead Pheasants.
5. Jas. J. Davidson, Esq. A misformed egg of the common fowl, kidney-shaped : though small, it was probably double-yolked.
6. Baboo Janmejaya Mittra. A coal black Jackal, young, (but about full grown,) female, dead. Now stuffed in the museum.
7. W. Thompson, Esq. Ballygunge Frontlet and horns of the European Roe-buck; and skin of a Tern (*Anous tenuirostris*), procured off Madeira!
8. Willis Earle, Esq. A few fishes and sea snakes, procured at the Sandheads.
9. Major Jenkins, Gowhatti. Some skins of Ducks.
10. Mr. A. Bruce, Chittagong. Skin of an Oyster-catcher (*Hæmatopus ostralegus*).
11. J. M' Clelland, Esq., Bengal Medical service. Carcass of a Wanderoo Monkey (*Inuus silenus*).
12. Capt. Berdmore, Madras Artillery, (through Capt. Phayre,) Maulmein. A living *Paradoxurus*, apparently undescribed ; since dead and preserved in the museum. Dr. Helfer procured the same species in the Tenasserim provinces, and Capt. Phayre in Arracan, where it is rare.
13. Murray Gladstone, Esq. A few Darjeeling birds, much injured ; but among them is a new *Heteromorpha*, Hodgson, connecting that division with *Paradoxornis*, Gould.
14. Rev. J. Mason, Maulmein. A few flat skins of bird. E. BLYTH.

For May Meeting, 1848.

1. J. M' Clelland, Esq., Bengal Medical Service. Skin of *Hylobates lar*.
2. Baboo Rajendro Mullick. A small species of Kangaroo, dead : prepared as a skeleton, the fur having been clipp'd short ; skin of head preserved.
3. Capt. Roger Rollo, 30th Madras N. I. A few bird-skins, from the Nilgherries ; and with them an imperfect skin of *Sciurus macrourus*, perfectly similar to the animal of Ceylon.
4. Capt. E. F. Smith, Sadyia. Skin of a new species and genus of Caprine Ruminant, with horns nearly as in the Gnoos (*Cutoblepas*) : adult female, now mounted in the museum.
5. Mr. McFarlane. 3 deformed living Pigeons.
6. Mr. Wagentreiben. A young living example of *Monitor salvator*, found on board ship upon the voyage from Bombay to Calcutta.
7. Mrs. Duncan Stewart. Three specimens of snakes, from the neighbourhood.
8. Capt. Phayre, Maulmein. A box of sundries, containing two skins, with separated skulls, of *Nemorhaedus sumatrensis*, from Tenasserim ; the hairs of the nuchal mane but partially white : portion of a skin of *Presbytis Phayrei*, nobis, XVI, 773 : and imperfect skin of *Felis bengalensis*, resembling the ordinary Nepal, Assam, Sylhet, and Arracan variety, and not approximating to the markings of the Malayan variety (?), v. *F. javanensis* : vide p. 256, ante.
9. Capt. Berdmore, Madras Artillery, (through Capt. Phayre.) A living specimen of the large Tenasserim land Tortoise ; identical in species with an individual formerly sent from Arracan by Capt. Phayre. E. BLYTH.

For June Meeting, 1848.

1. Walter Elliot, Esq. Madras C. S. Two skins, male and female, of the four-horned Antelope, sent as *Tetraceros subquadricornis*, Elliot, the male having the anterior horns reduced to slight rudiments not visible above the

hairy pelage of the brows. Nevertheless, it does not now appear to me that this animal is distinct from the common Bengal species, in which I find that the anterior horns very commonly remain permanently rudimental, as in one individual just dead, which I have kept for more than a year, and in another which I formerly possessed and which is also now mounted in the museum. These differed in no other respect whatever from a male which I still have living, but in which the anterior horns have attained their full development: and that the age of this and of the animal just dead was about the same, i.e. that they were kids of the same season, is indicated by their both shedding the blunt outer sheath of their horns at the same time. All are from the Raymang hills; and during the year and upwards that I have kept the animal just dead, its rudimental anterior horns did not increase in size. Capt. Hutton even writes me word—"Depend upon it all the 4-horned Antelopes are *T. quadricornis*—the development of horns is very variable. I have one skull in which the posterior horns are 3 in. long; the right anterior horn is 1½ in. long and perfect,—whereas the left horn is not quite 1 in., forming a mere knob. I have been told," continues Capt. Hutton, "by sportsmen who had often shot them that the front horns are very often mere knobs, and that it's somewhat rare to get a perfect head in this respect." Mr. Elliot once sent me on loan a specimen with fully developed anterior horns from the Wynnaad: but such individuals would seem to be rare in S. India. Of us (so termed) *sub-quadrucornis*, he writes—"They are found throughout the Dekhan: the specimen now sent is from the eastern ghats between Nellore and Cuddapah. I have also received young living specimens from the hills above Chittoor and Vellore on the borders of the Barakshahr, which shows the distribution to be very general." The young might, however, be referable to either variety.

2. Major Ouseley, Chota Nagpore. Skin and skeleton of a young bull Gaour.

3. Baboo Rajendro Mullick. A dead Kangaroo, of the species *Halmatus derbianus*; now preserved as a stuffed specimen.

4. Mr. Ransom, of the Pilot Service. A living Tropic-bird, or "Bosw'ld bird" (*Phaeton aethereus*), since dead and preserved as a skeleton. This bird was very helpless on the ground,—unable to stand up, with its legs stretched outward; but on a steep surface it could climb, using its beak like a Cormorant.

5. Mr. C. McLeod. Skin of a large and very handsome Tibetan Dog, with Wolf-like head: and a collection of chiefly marine shells, with corals, echini, &c.

6. Mr. P. J. Van Grieskin. A living domestic cock, with one leg reduced to a minute rudiment.

7. G. T. Lushington, Esq., C. S., Almora. A skin of *Ovis ammon* in good order; and two skins of *Gazella picticandata*, (Hodgson,) one perfect, the other having the muzzle eaten away. The *O. ammon*, if not required by the Society (which it is not), Mr. Lushington requests may be presented to his name to the museum of the Hon'ble Company, in London.

8. J. M'Pherson, Esq. A few common Crustacea, among which is a *Palamona carcinus*, having an arborescent fucus growing from the extremities of the rostrum.

9. F. W. Russell, Esq. Collection of shells, chiefly marine.

10. Mrs. Bacon. A few shells from Australia and Torres' Straits.

11. Capt. Thomas Hutton, Mussooree, some small birds from that neighbourhood, comprising 4 males and a female of *Agithatus flammiceps*, a male *Pionustum innominatus*, and 13 other specimens, among which are two of a *Plegoscopus*, new to the Society's museum, but with which I have long been familiar.

E. BLAKE.

Minimum Pressure observed at 08.50 m.									
Maximum Pressure observed at 08.50 m.									
Days of the Month		Barometer due to Reichenberg.		Barometer due to Reichenberg.		Wind.		Temperature.	
1	2	Orifice Air	From Bulb,	Orifice Air	From Bulb,	Wind.	Wind.	Upper	Lower
Temperature.	Wind.	Wind.	Direction.	Temperature.	Wind.	Dir.	Dir.	Temp.	Elev.
1 In 29. 610 .903	2 97.9 80.8 N. E.	Cumuli.	29.493	86.3 82.3	77.8 S. E.	Raining.	96.7	0.64 0.70
3 94.3 90.9 82.4	Ditto.	Ditto.	.545	82.5 82.6	78.4 N.	Cloudy.	96.3	0.76 0.82	
4S 92.3 90.0 80.7 E. S. E.	Ditto.	Ditto.	.560	80.5 79.8	77.0 S. E.	Raining.	96.3	0.30 0.45	
5 88.4 86.9 81.5 N. E.	Ditto.	Ditto.	.548	88.3 87.0	79.3 N. E.	Cloudy.	94.7	0.29 0.32	
6 88.0 86.0 80.6 N.	Ditto.	Ditto.	.553	82.4 83.4	79.7 S. W.	Ditto.	91.3	0.74 0.79	
7 87.8 85.3 80.4 S. W.	Cloudy.	Cloudy.	.480	89.4 87.4	80.2 S. W.	Ditto.	90.0	0.18 0.22	
8 91.8 89.0 82.0 S. W.	Cumuli.	Cumuli.	.410	90.2 88.3	81.9 S. W.	Ditto.	91.8	.. ..
9 85.0 84.2 80.2 S. W.	Ditto cloudy.	Cirro cumuli.	.425	90.9 89.0	81.3 S. W.	Cumuli.	91.3	.. ..
10 88.3 88.5 82.3 S. W.	Cirro cumuli.	Cloudy.	.436	92.4 91.2	81.5 S. W.	Cloudy.	93.8	1.18 1.20	
11S 84.3 84.9 81.9 S. W.	Cloudy.	Cumuli.	.444	83.8 83.2	79.0 S. W.	Ditto.	91.4	.. ..
12 .588 91.4 90.2 83.0 S.	Cumuli.	Cloudy.	.439	90.5 90.2	82.5 S. W.	Cirro cumuli.	93.4	.. ..
13 91.9 90.5 82.8 S.	Ditto.	Ditto.	.474	96.0 93.6	82.5 S. E.	Cumuli.	97.0	.. ..
14 90.6 92.2 90.4 82.7 S.	Ditto.	Ditto.	.503	87.0 85.8	81.6 S. E.	Cloudy.	95.4	0.10 0.12	
15 592 94.0 90.8 83.0 S. E.	Ditto.	Ditto.	.508	84.9 84.5	81.2 S. E.	Ditto.	94.9	1.54 1.60	
16 .593 93.0 89.7 82.5 S. E.	Ditto.	Ditto.	.438	95.4 91.3	82.0 E.	Cumuli.	95.3	.. ..
17 .532 90.3 88.6 81.9 S. E.	Ditto.	Ditto.	.410	89.9 88.0	81.5 E.	Cloudy.	91.9	0.44 0.48	
18S 89.6 87.4 81.7 E.	Cloudy.	Cloudy.	.353	89.4 86.0	81.3 E.	Ditto thundering.	91.8	0.78 0.86	
19 .494 88.0 87.4 82.9 E. S. E.	Ditto.	Ditto.	.424	87.5 87.2	82.4 S.	Raining.	89.9	0.88 0.94	
20 522 78.3 80.7 79.3 S. S. W.	Raining cloudy.	Raining cloudy.	.418	88.3 87.4	82.4 S. W.	Cloudy.	87.3	4.00 4.07	
21 .544 83.0 82.8 80.0 S. S. sharp.	Cirro cumuli.	Nimbi.	.446	89.0 88.6	82.6 S. W.	Ditto.	90.4	.. ..
22 .565 88.7 88.3 83.0 S. sharp.	Cloudy.	Cloudy.	.465	86.8 86.8	81.8 S. W.	Hazy.	86.4	0.12 0.16	
23 .549 88.5 85.5 81.3 S. W.	Ditto.	Ditto.	.474	89.7 89.4	83.8 S. W.	Cloudy.	92.4	0.09 0.16	
24 .531 88.5 88.2 82.0 S. W.	Ditto.	Ditto.	.472	91.6 90.3	83.5 S. W.	Cloudy.	91.4	0.58 0.64	
25S .597 91.4 90.4 83.6 S. W.	Ditto cirro cumuli.	Ditto cirro cumuli.	.468	94.8 93.4	83.8 S. W.	Ditto Cumuli.	95.4	.. ..
26 .640 81.4 82.2 77.9 N. N. W.	Raining.	Raining.	.523	90.6 88.9	81.4 S.	Ditto.	95.4	.. ..
27 .608 89.8 89.3 83.4 S. S. W.	Cumuli.	Cumuli.	.541	89.0 88.1	83.8 S. W.	Ditto.	90.8	0.06 0.08	
28 .608 89.8 89.3 83.4 S. S. W.	.. ..	.. ..	.512	90.7 88.7	82.6 S. E.	Ditto.	93.9	.. ..
Mean 29.563 35.8 27.4 31.7	29.469	88.7 87.3 81.4	29.469	88.7 87.3 81.4	29.469	88.7 87.3 81.4	29.469	92.8	92.7 10.28
Corresponding Mean 87.5 87.5 87.5 81.7	29.494	90.1 88.5 81.7	29.494	90.1 88.5 81.7	29.494	90.1 88.5 81.7	29.494	92.7 10.28	92.7 10.28

JOURNAL
OF THE
ASIATIC SOCIETY.

SUPPLEMENTARY NUMBER FOR JUNE, 1848.

THE TURÀEE AND OUTER MOUNTAINS OF KUMAOON,
By Major MADDEN, Bengal Artillery.

(Concluded from page 450.)

11th March.—To Kulounia, called 8 coss, about 12 miles, which, with the intensity of the heat, direct and reflected from the mountains, at the very foot of which lies the rough and circuitous pathway, greatly fatigued the coolees. The following stations occur: Gurjoo Goth, 2 coss: Belpanee, 1: Sukar Kholee, 1: (both these are just deserted:) Dogaree, 1: Deolagar, 2: Kulounia, 1 coss.—These are generally at the exit of a stream from the mountains; placed amidst the most lovely scenery; the mountains of every height and form, covered with forests of every hue, green, red, and yellow. To the right of the path stretch to the south several prairies of tall grass, where the guides were in no small fear of encountering the elephants, which are infinitely more dangerous in their opinion than the tigers: but neither appeared. Between Doogola and Gurjoo, we passed a pretty large, but nearly dry channel, called Kulooah Ghat, about a coss up which is Burgoth: we avoided this, and struck direct through the Sal forest, regaining the path a mile eastward. A little east of Belpanee, the route passes bybur Mundee, whence there is a hackery route to Bireea Mnjhoula; it lies on the north bank of the Kaminee river, which here leaves the mountains with a brisk current. The Mundee enjoys a considerable traffic in timber, bamboos, and hill products. The Kaminee flows on the right hand down to Dogaree, "the two streams;" this is the

name of another considerable Goth in an open prairie, where it receives a tributary of equal size from the east, the Deolagar ; this gives name to another mart for timber, &c. close under the hills. The path keeps to the right or north bank of this stream, under a beautifully wooded escarpment ; on the summit of this, two miles east of Dogaree, is the Syna ka Panee Goth ; and at its base crop out large masses of brown iron ore, or brown Haematite, said to be rich in metal, and often associated with coal. The spot is called Dhan Dhoonga. The last two miles from Deolagar to Kulounia lie through Sal forest, with half a mile more in the deep Khyr and Seesoo growing bed of the Punnean or Punwyn river, which is about 100 feet below the level of the Sal, and carries a small stream of good, clear water. It is said to be called Jugboora in the plains, and to flow to Suniya, 5 coss down ; dividing the Choubhynsia district from that of Tula Des—"the low country," which includes Burm Deo, and the outer hills as far as Chhirapanee. Kulounia is a small Mundee just on the gorge of the mountains, on the west bank of the Punwyn : now vilely hot, with myriads of flies, and little or no shade. The inhabitants are mountaineers from Furka, and traders from Pelegbheet, engaged in the timber and drug business. One of these, Nuthoo Mull, who also keeps a Buniya's shop, was very civil, and gave me shelter under his roof ; the heat in a pal being insupportable. He has 10,000 rupees embarked, chiefly in the manufacture of Kuth, (*Terra japonica*) here called Kutha ; but nothing comes amiss : till late at night he was sedulously engaged with the hillmen, and loud and frequent were the disputes as to the value of the various articles, which he purchased, independantly and in small quantities : no temperament but that of a Hindoo could stand the wear and tear. The following are the prices he pays :

Babur or Byb grass : 3 to 4 rupees per 100 muns.

Moonj, Sirput, and Tat culms for pens : various.

Ghee : 1 rupee for 7 kucha sera.

Borax, brought by the Bhotiyas : 7 to 8 rupees per mun.

Lichens for dying rose-color : "Chulpooree," "Charchubeelu," rupees per mun.

Turmeric : 4 rupees per mun.

Myrobalans (Hur) 1 rupee per ditto : said to be produced (abundantly) only every third year : a belief common here in reference to many other fruits.

Madder : " Munjeeth," 4 annas per Puseeree.

Kaephul bark (*Myrica sapida,*) 2 pice per ditto.

Tuj bark (*Cinnamomum albiflorum,*) 1 ana per ditto.

Tuj leaf. $1\frac{1}{2}$ ditto ditto.

Bamboos	{	small : 20 to 30 score per rupee.
		medium. 6 ditto ditto.
		large. 2 ditto ditto.

Soapstone : " Khuree." *Probably from the Thakil.*

Kuth, Catechu, 6 rupees per mun.

This traffic will be terminated in a week or two, as the mountaineers cannot stand the heat : the Kuth manufacture, however, goes on till the setting in of the rains : the workmen, who are all Dooms, called "Khyrees," from the *Acacia catechu*, then retire to the hills till December, and Nuthoo Mull retreats to Peleebneet. During the season, one portion of the Khyrees is constantly employed in cutting down the best trees, and for these they have to search far in the jungles : only those with abundance of red heartwood will answer. This is chopped into slices a few inches square. Under two large sheds are the furnaces, shallow, and with a slightly convex clay roof, pierced for 20 ordinary sized Kedgree pots : these are nearly filled with chips : and water is then poured in and boiled, till the contents of twenty will only fill two pots ; which takes place in about an hour and a half. The liquor resembles thin, light Port, and the Kuth crystallizes on leaves and twigs thrown into it for the purpose : each pot yields about a ser : of an ashy white color. The work is carried on for 20 hours out of the 24, by relays of women and children : the men merely preparing the wood ; this after being exhausted, is turned to account as fuel. Each furnace pays a tax of 4 rupees per annum to Government.

Nuthoo Mull informed me that the open bed of the river exposed to the full force of the wind, is the only ground tenable during the hot season, and that at the expense of much fever. Wherever from the contour of the mountains, or the screen of the forest, the wind is excluded, the climate is deadly. All agree that in advancing eastward, the Turaee becomes more unhealthy ; a fact more to be attributed to its increased moisture and denseness of vegetation than to any addition of dimension : for it appears from Kirkpatrick that the Nepal forest is not above 10 miles wide.

The *Buchanania latifolia* : "Mooria" and "Piyal," the fruit "Chironjee," is abundant on the hills behind Kulounia ; and in the thickets are *Ventilago maderaspatana*, with *Berchemia laxa*? both called "Kala-lug," but the former also known as Rukut-peeta. *Mimosa rubiginosa* : "Ugla," *Acacia cæsia*, "Kutrar," and an enormous climbing *Acacia*, called "Agla" and "Awul," are also common. The stem of the last attains a thickness of two and a height of 100 feet : the bark is used for what Roxburgh calls the "nefarious purpose," of poisoning fish. It seems to be his *Acacia pennata*.

The epochs of the months, as kept here by the Peleebheet traders, differ from those of the mountaineers. Thus, according to the former, March 12 answers to the 10th of Chyt, while by the hill reckoning it is only the 1st. The difference is said to be occasioned by the lowlanders employing the lunar month, calculated from the full-moon : the hillmen use the solar month, calculated from one *Sunkrant* (or sun's entrance into a sign) to another, commencing the year with Magh, answering to January and February, and so on : the 9th month they call "Ussouj," a corruption of Aswuyuja ; and the 11th, comprising Nov. Dec. is "Mungsir," from "Mrigasirus," "the head of the deer," one of the 27th Nukshutras or lunar mansions. The "Sunkrants," are all more or less observed as Holydays : that of the sun in Aries is illustrated by the Holee, which is kept by the Gorkhas with a regular May-bush, cut and brought in with pomp and music, and decorated with parti-coloured shreds, as used to be the case in England ; the sun's entrance into Libra in Ussouj is also a great day with the hillmen, being the Kalendaric termination of the wet season, and commencement of the autumnal harvest ; on this occasion a human effigy called "Khuturwa," is made of straw and sticks, decorated with the jhoola (*Antennaria*) and other flowers, paraded about the village, and in the evening thrown into a large bonfire : an emblem perhaps of the parting sun.

12th March.—To Burm Deo, 8 coss, about 10 miles. The places which occur on the route are Tootooria, 1 coss : Chela, an open spot without trees or water, (such are called "Thuppur") ; both these Goths are just deserted : a little beyond Chela, called 2 coss from Tootooria, is Kopatal, so named from a deep pool formed by a stream which here issues by a most romantic, shaggy, glen from the mountains : the path ascends by its right or south bank through Sal forest to Dana Goth

1 coss ; this is rather a large settlement, still tenanted by people from Chumpawut. Nearly opposite this, at the base of the mountain is Bushtia village, above which are the fort and pass of Timla, leading to Chumpawut, and crossing the Ludheea river at Kela Ghat. Timla fort is 3908 feet above Calcutta ; Kela Ghat 2204 ;—it was by this route that Captains Gardner and Hearsay invaded Kumaon in 1814, but miscalculating the strategy and bravery of the enemy, were defeated and taken prisoners by Hustee Dul near Khilputee, and carried to Almorah. The pass is said to be very easy, and as the only made road goes round by Burmdeo, it is in contemplation to construct one here, which would greatly benefit the communication between Suniya and Chumpawut. Limestone is to be had at Choopanee, somewhere near Bushtia, 1587 feet above Calcutta. Dana Goth is situated on the N. W. bank of a wide stony channel, the Keela rowl ; the path crosses this and keeps its left bank for half a mile towards Khulooa Kholee, 1 coss : and then proceeds via Ginda Khalee and Bhewria Khalee to Burm Deo. At these last clearings, and others in this direction, rice, ghweeas, turmeric, &c., are cultivated in the hot and rainy seasons : but the farmers all take refuge nightly in the mountains ; the young plants are protected from the heat of the sun in April and May by screens of Sal branches with their leaves, which check the evaporation. From this point the Soor river is seen entering the Kalee about 2 coss south of Burm Deo : it flows in a very wide stony bed, and comes from the west, apparently combining all the streams which do not join the Dowa. Somewhere on its ~~banks~~ the Gorkhalees under Hustee Dul were defeated by the Rohillas.

Bhewria Khalee is about one coss from Burm Deo, on the brink of the low Kadir land, which seems admirably fitted for cultivation, but is very partially tilled. As far as Chela Goth, the path to-day was bad, with several steep stony ascents and descents at the torrents which cross it ; from Chela Goth there is a hackery track through the forest to Burm Deo ; but the guides frequently adopted short cuts, which were bad enough.

Burm Deo is the great mart for Eastern or Kalee Kumaon, and the Gorkhalee province of Dotee. Its proper name is Moondias, Burm Deo being a Goth about a mile north, the limit of wheeled carriages, opposite to which the Kalce pours down in its last rapid. Here it is said

that Bruhm did penance—not Brahma the Creator, who in these parts is reduced, under the designation of Choumookhee, to the office of an agricultural care-taker,—but the Supreme Being himself. No one can say for what purpose he did so: but a Hindoo is never at a loss for a reason, and when twitted with the peccadilloes of his gods, will reply that they were always well whipped for them: and if gods do not escape punishment, how much less men! a conclusion more ingenious than sound. Burmdeo is given as one of the Kutyoor rajas, and the place may have been named from him. Except in the unhealthy season, Burm Deo is not a scene for penance; it is on the contrary, placed at the gorge of perhaps the most magnificent portal to the Himálaya. The Kumaon chain, bold, lofty, and scarped, with a superb glacis of forest along its base, here meets the Dotee mountains at a right angle; these, if possible, clothed in still thicker forest, extend north and south, running far down in this last direction, with the Kalee flowing at their foot so closely as to leave our restless neighbours scarce room for their Mundee. The river indifferently known as the Kalee, Surjoo, Sarda, Ghughra, winds its way through the angle to the N. E., where the mountains on the Kumaon side are scarped into lofty walls and pinnacles, on the topmost of which, about 8 miles distant, is the far-famed shrine of Poonagiri, where Devee is adored by pilgrims from mountains and plains. Behind this, the magnificent mountain of Nalee-mun rises far above the forest: on its western flank is the pass to Chumpawut.

The Kalee opposite the Mundee, is about 100 yards across, and from 10 to 15 feet deep, perfectly clear and flowing ~~with~~, a strong steady current, like the music of Mira O Norma; it is now about 20 feet below its level in the wet season: the only means of passing are four canoes, the hollowed trunks of Semul trees, two of which are ours, the others belong to the Gorkhas. During the malarious season, or from May, when Burm Deo becomes a solitude, the boats are hauled out and laid up in ordinary. Below Burm Deo the river wanders amongst a labyrinth of low stony islands covered with Seesoo; they belong to the King of Oude, and are called "Chandnee Chok," apparently in jest. Great quantities of Sal, Seesoo, Bamboos, &c. are floated down from the mountains, and 30 miles below this, the river becomes permanently navigable at Moondia Ghat, the Gurhmooktesur of the Surjoo. It is described as flowing between steep, well-defined banks, through a beau-

tiful country, and joins the Gogra proper at a place called Swurg-dwara "the gate of heaven." Captain Herbert calculated the following as the discharge per second in cubic feet, where they enter the plains :—

Kalee 4,800.

Jumna 4000.

Ganges 7000.

Sutluj 8,100. This is probably greatly in excess : the last is certainly a smaller river than the Ganges.

Moonias Mundee is placed close to the right bank of the river, 885 feet above Calcutta : it consists of one good broad street, but the habitations are mere sheds constructed in the slightest manner of mats and sirkee, so as to be taken down on the first alarm of fire, which has destroyed the place more than once, and is especially fatal here from the furious gales which blow alternately up and down the river : they are stocked with vast quantities of turmeric, &c. denoting a very considerable traffic : and sold, I was informed at the following rates :—

Peepla mor (Piper longum root) : 5 to 20 rupees per mun.

Rooenee (Rottlera tinctoria powder) : 10 to 16 ditto.

Lodh bark (Symplocos racemosa and paniculata.)

Balchhur or Mashee (Valeriana Jatamansi, Spikenard) : 10 ditto.

Sohaga (Borax), 10 ditto.

Turmeric, 4½ : Ginger 5 per mun.

Ilachee (large Dotee Cardamoms) : 20 ditto. of

Churayuta : 2 sorts, chiefly from the Thakil and other mountains

Shor and Dotee—~~yellow root~~ 4 ditto.
dark root 2 ditto.

Honey, Wax, Sunkhya and Hurtal, (from Tibet,) Kutki, (Picrorhiza), Rhubarb, Meetha (Aconitum ferox), Nigala Bamboo, hawks, the Nepal black Myna (from Dotee, each pair costing 5 rupees and paying 12 annas on crossing the river !) and a drug called *Churmis*, are also procurable here : the latter seems to be a root, of the same nature as the Aconite, but longer, thinner, and much curved : from these circumstances it would be identified with the Seengiya Bikh, but the druggists say they are different, and the Churmis is attacked by insects. The word comes from the Sanscrit Churmmu-kusha "destroying the skin."

Most of the dealers here are from Peleebheet, which is a place of much trade and importance, by their account.

Opposite to Moonias Mundee the Gorkhas have their mart, called Sooa Mundee, built irregularly on the stony bed of the river, and backed by a high bank of clay and gravel, on which grows the forest. The situation is inconvenient and confined : much less business going on than on our side, where there are no duties. The Gorkha government farms its duties here for 24,000 rupees pér annum they told me. They keep here a party of 25 Sepoys, apparently Dotee men, under a Soobadar ; the authorities and the people were very civil in showing me over the mart, but the former will not admit further progress : in truth, as there is nothing but forest and mountain, there is, save to the naturalist, no great inducement to wander. The civil authorities were in Kucheree, but seemed to have little or nothing to do ; yet on our side the general impression is that crimes and outrages of every description are rife, and meet little check or redress in the Gorkha territories. Our people occasionally complain of the delays of the Courts, and the corruption of the native officials, who always side with the longest purse, but no one can travel over India and enquire amongst the mass of the people without finding a very generally expressed opinion of the superiority of the English rule ; and, in native states, a frequent wish to come under it. "Is the rule of the Gorkhas returned ?" is the usual exclamation in Kumaoon where a person thinks himself wronged.

A cursory examination of the forests about Burm Deo and Poonagiri discloses a number of interesting plants : and probably the glen of the Kalee up to Ascot would afford many novelties.

Xanthoxylon Connaroides ? W~~t~~ and A. arbore~~s~~, near the Bitreegar.

Petalidium Barlerioides : "Bukroula."

Eranthemum nervosum. •

Strobilanthes auriculata : "Til-kupooree."

Phlogacanthus thrysiflorus.

Gouania nepalensis, Wallich.

Acacia "Khyn :" an armed tree with the blossoms of the *Khyr* and the fruit of the *Siris* : wood excellent.

Inga bigemina : "Kuchlora," a large and useful timber tree.

Symplocos spicata : "Lodh," a large tree. The pitcher-shaped, ribbed seeds, called "Bholia," are worn in necklaces by children at Almorah to preserve them from ghosts, &c.

Annona squamosa : "Behé," most abundant in the swamps.

Ficus Kuthburee: a large tree. Poonagiri.

Rondeletia exserta? a tree, common also at Gungolee Bridge.

Chonemorpha (Echites) macrophylla: "Gur-budero."

Sabia paniculata: "Bukul-puta :" an extensive rambling, scandent shrub, with yellow flowers, at Poonagiri: on the Buliya : and at Gungolee Bridge.

Bassia butyracea: "Chyoora :" from about 1500 or 1800 feet up to 4500 : abundant in the shady glen below Poonagiri.

Wallichia (Harina) oblongifolia. "Gor-ounsa." "Kala-ounsa." ("Black Reed") : shady glens about Poonagiri temples. The fronds of this palm are said to form an imperishable thatch, and are also used for combs.

13th March.—To Poonagiri temples, about 8 miles E. N. E. and back to Burmdeo in the afternoon. The route is by Burnideo Gothi, of which the houses are permanent and firmly built on posts: this is the residence of the ferrymen. Hence we followed the Chumpawut road for 1½ or 2 miles, undulating on high ground covered with forest, the Kalee following beneath on the right hand in a magnificent gorge. The path then quits the main road, turning off to the right near Ranee-hath Goth, and for the rest of the way is rugged and difficult, the Ladagar torrent following in a woody ravine on the left. The total ascent cannot be under 2000 feet, which would make the elevation of the shrine nearly 3000 above the sea: at this level, though greatly cooler than Burmdeo, the ~~aria~~ ~~aria~~ of the Bhabar still prevails, with Sal woods and fine clumps of bamboo, which last, being sacred to Devee are never cut, the popular belief being, that if converted to use, scorpions and centipedes innumerable would issue forth to punish the sacrilege; so amongst the Greeks, the cultivation by the Phocians, of the Criscean Plain, dedicated to Apollo and to perpetual sterility, induce the sacred war. It is not generally known that the vernacular "Bans," Bamboo, comes from *runc*, a family, either from the habit of the plant to produce its numerous stems in clumps, or from the fact that under the patriarchal Government, as still under the Chinese, the Bamboo is a chief means of maintaining social order. The Sal in Kumaon is found, mixed with Cheer Pine, fully up to 3500 feet, a much higher level than it attains to the N. W. On the sunny slopes about the

Poonagiri temples the Byb or Babur grass (*Eriophorum cannabinum*) is abundant, and does not appear to flourish at much lower levels.

Nothing can surpass the variety and beauty of the scenery about Poonagiri : nature absolutely revels in the luxuriance of the universal vegetation, which no American forest, north or south, can possibly exceed ; but to superstition alone are we indebted for a path through and over the otherwise impassable thickets and precipices. The first symptom of sanctity in the wilderness is a small Murhee, dedicated to Bhairoo, or Muhadev, considered as his own door-keeper ; here the pilgrims leave their shoes ; and no man of low caste, of notoriously bad, or even unfortunate character, or filthy in person or discourse, is knowingly allowed to advance further. Coming under the first, at least, of these predicaments, I had arrived within a few hundred yards of the small village of Toonias, the residence of the 20—30 Poojarees who do the honors of the place, when, to my astonishment, I was assailed by the whole crew, loudly proclaiming that the shrine was deserted by my intrusion, that no European had ever approached it before, and demanding, in a very insolent, and almost violent manner, my immediate return. I assured them that such was impossible during the heat of the day, after a three hours' walk ; that I certainly should not descend till I had breakfasted and looked about ; and that the mountain was mine as much as theirs. They were exceedingly angry ; but we at length effected a pacification by the compromise that I was not to go nearer than a hundred yards to any of the temples, and that I was to offer a bottle of cognac to the goddess, in default of ~~a goat~~, which was not to be had, and about which I demurred, though they alleged the example of sundry sahibs, who had sent proxies for this purpose. On the contrary, I expressed my horror and disgust at the custom of polluting the hill-tops and groves, with the gore of miserable bleating kids and goats, which must have a tendency to brutalize the character, to reconcile and familiarize the mind with bloodshed and murder, and to foster the pernicious sentiment that the gods are necessarily pleased whenever themselves and their priests are stuffed with roast-meat. A most furious altercation among themselves, which lasted about two hours, respecting the division of the spoils of my followers and other pilgrims, was the corollary to this homily.

Toonias Hamlet lies in a sheltered glen about 200 feet below the

westernmost of the three shrines, the only one which I visited; it is a small, black, domed structure, coated with copper, and placed on the crest of the great mural precipice of sandstone which here faces the south. A little to the south-east, this wall terminates and the mountain springs up into a very lofty and remarkable pinnacle of rock, presenting a precipitous face to the river, which rolls at its base in a winding chasm of vast depth, the waters generally calm and of a lapis-lazuli tint. The gorge makes a rapid bend here, which brings the current right against the upper end of the cliffs, which perhaps owe their existence to its slow operation. Each shoulder of the rocky pinnacle is consecrated by its temple, the easternmost being the most sacred, and of very difficult access over cliffs and razor-edged ridges. Here the animals are sacrificed, and the sinners properly japanned and fleeced. The Brahmins appropriate the head, and I believe one shoulder of each beast assassinated, with all the cash they can extract, and considerable numbers of cocoa-nuts, the offering of which seems to be a sign connecting the mountain goddess and her rites, with the ocean-loving Kalee of Calcutta. The acme of merit is attained by him whose offering, like Balak's, consists of seven goats. The peak itself is the adytum of the goddess, where none can intrude with impunity: a fukeer who ventured to do so in days of yore was hitched across the river, and found flattened to a pancake in the Sidh Bun of Dotee.

The classical name of this holy site is Poornagiri, which the Brahmins render by "~~complate of~~ entire mountain," an unhappy interpretation, since the mountain is cut in two, and one half removed; a more likely derivation is afforded somewhere by Wilford in the suggestion that the Anna Perenna of the Romans was identical with the Sanscrit Unn-poorna, "The filler with corn," a name of Devee, indicating also by the suppression of the digamma, the origin of Diana (grain goddess) and Demeter (Ceres) Mother-goddess: the Indian goddess being still familiarly known as *Mae* and *Muha-Mae*; "great mother." She is also adored near Almorah as Putal-devee, Queen of Hell, a function similar to Persephone's. At Nynee Devee on the Sutluj, at Kedarnath, at Syama or Siahee Devee near Almorah, and probably at Poonagiri, she is entirely clothed in black, and we find that one of Proserpine's epithets was *Melampeplos*. The most philosophical in-

vestigators into the nature of mythology seem now agreed that the legend of Ceres, and Proserpine "gathered by gloomy Dis," is to be explained by the history of Seed-corn from the time it is buried in the earth to harvest : those who "plucked the heart of the mystery," were not perhaps aware that Proserpina is good Sanscrit (*prusurpun*) for the "sprouting," or germination of corn : Burns has done unconscious justice to the allegory so understood in his spirited Ballad of "John Barley corn." By such clues we come to reject the Miltonic but puerile doctrine that the deities of the nations are so many "real essences," intelligent, but generally malevolent ; to replace it by the conclusion, drawn from a multitude of converging proofs, that they are none other than the powers and operations of nature deified in the struggling infancy of agriculture and society. As such, the adoration still paid them, if useless, is at all events harmless : and viewed in the light of reason, their worship, personified as idols, is by no means so different from our own as to justify the outcries which resound from the oracles of Exeter Hall, ever ready to judge another man's servant. For, says Locke, man being the measure of all things, can only form an idea of the incomprehensible divinity, by enlarging towards infinity, as best he may, the qualities and powers, which by sensation and reflection, he perceives to exist in himself. He allows, in degree, the same attributes, to the angels, &c. ; but in neither case can his ideas surpass in number and variety the qualities which he experiences in his own mind. And then the English metaphysician and man of sense, goes on to conclude that the First Being "it is certain, is ~~immensely~~ more remote, in the real excellency of his nature, from the highest and perfectest of all created beings, than the greatest man, nay purest seraph, is from the most contemptible part of matter ; and consequently must infinitely exceed what our narrow understandings can conceive of him." It appears, then, that whether the object be the abstract conception and work of our minds, and their image, or that of our bodies and the work of our hands, it must infinitely fall short of the truth ; and that *neither party can consistently upbraid the other with its mean conceptions of the divine nature.* In this view, also, the Brahman is justified in his tenet that Bruhm is identical with his own mind. The argument might, by those concerned, be turned to good account against the Mohammedans, by showing that their idea of Alla is not so utterly

removed from that of the idolators as they commonly plume themselves ; while it is certain that no people are more ingenious than the Hindoos in concealing their ignorance on these subjects under the mist of grandiloquent negatives.

During the heat of the day, whether exhausted by their quarrel, mollified by the brandy, or acting on the Shaksperian maxim that "things without remedy ~~should~~ be without regard," the Brahmans became more reconciled to the profanation of my presence, and entered on a conversation from which I learned for the first time, that the position in time of the Dwapúr and Treta Yoogs had been inverted ; the latter, which would have been the third in order had events followed their natural course, having by the will of the gods, become in reality, the second age ; while the Dwapúr became the third. To what reformation of the Indian Kalendar such a countermarch should be ascribed would now be difficult to discover, and were the events historical, would sorely puzzle the chronologist ; but where all is chimera and fable, it is of no importance how the parts are arranged. During the Golden age my informants agreed that men, and even women, were very silent, and only used their tongues from urgent necessity ; a sufficient proof, as I told them, that the Iron age was fully come. Their dogmas on the mathematical ratios of virtue and vice in the Four ages are calculated to exercise an injurious influence on the national morals ; for where men are taught that crime and calamity are destined beforehand to become more and more rife, they will commit every enormity with a pious ~~resignation~~ and conformity to the will of heaven, and "make guilty of their disasters, the sun, the moon, and the stars, as if they were villains by an enforced obedience of planetary influence." Would not a general reformation, bring about a state of affairs, which, by contravening the statements of the Shasters, would, in fact, disprove their divine origin ? But the prophecy is really working itself out so far as the institutions of Hindooism are in question ; daily are Bráhmans less and less honored, kine more and more eaten, widows less and less burned. The dominion of the English in Hindooosthan was, they said, clearly predicted in the Poorans, with an assigned duration which would satisfy even the proprietors of railway and India stock, and fill with dismay the hearts of Parisian Journalists ; these seers of Kumaoon, who know very little of the present, and, save the

dreams of the Shasters, nothing of the past, assured me that we were safe for I know not how many thousand years. On such occasions one is inevitably reminded of the aphorism stamped by the quotation of Alexander—a fair guesser is the best prophet—as well as of the famous Divining Ape of Master Peter, who, as his owner candidly admitted, told much more concerning things past than things to come. It is, fortunately for human responsibility, a mark of authentic prophecies to be so obscure before the event, and very frequently even after it, that it is impossible for the agents to discover that they are merely performing what had been written of them ages previous to their birth; but Hindoo prophets thought differently, and if my Brâhmans were not lying or deceived, the rise and progress of the English in India is detailed in their books with a minuteness surpassing even the notices of the kings of the north and south; of our decline and fall, distant as they are, they politely omitted all discussion. The pilgrims begin to arrive here in November, and the Teeruth ends in April.

14th March.—To Belkhet, 13 miles, over the Byala or Bylchheena Pass; the road gradually rises, with several interruptions where torrents occur; pass Chundrabun, a deserted Goth, marked by a large Peepul tree: then the Bitreegar nudee, carrying a good stream of brilliant water; next, Tula and Mula Duh, two small, cultivated, crater-like depressions; and, a little higher, the Toongagar stream. In this neighbourhood there are said to be some small tarns called Shiala, which I did not visit. At the Toongagar the road becomes excessively bad, very indifferently lined, and almost blocked up by large angular boulders. A steep, and at this season very hot ascent, leads to the crest of the Bylchheena Pass, from 4000 to 4500 feet above the sea. Near the summit, Mr. Lushington, the Commissioner, has constructed a Noula or covered well, which affords the fainting coolee a very welcome and necessary refreshment. A favorite Dhurmm, or good work amongst the richer natives of the mountains, is to pay a man of good caste to station himself in such sites as this, and supply gratis, without distinction of caste, a cup of cold water to every passenger; the custom is known also in the plains, and is said to be founded on the express precept of the Shasters; it seems unknown to those who in Europe and elsewhere declaim so volubly and so ignorantly against the selfishness of the Hindoo nation.

The descent from the pass is continuous on the north side, and latterly very steep, to the Ludheea or Loodheen river, 4 or 5 miles down : it is even now a pretty large and rapid stream, and when the rains fill its wide stony channel becomes unfordable, and closes this route for many days together ; not that in the wet season it is much frequented ; but many fatal accidents cry out for a bridge. Its sources are on the southern face of the Deo Dhoora range; whence, separated from the plains by the Dhyanee Ras and Tula Des mountains, it flows S. E. to join the Kalee above Burn Des, about 4 miles below Belkhet. The road from the foot of the pass turns to the left, up its right bank, and in a mile or so we reach a hut, with some scanty cultivation across the river, which bears the name of Belkhet ; but no supplies are procurable here, or indeed any where between Burn Deo and Chumpawnt. The glen is here less than a mile across, and being only 1300 feet above the sea, and walled in by lofty mountains, is exceedingly hot and unhealthy. The pretty Bantam-like jungle fowl is very common, and so tame that I noticed several emerging from the thickets to maternize with their bulkier but degenerate race of the bant-door.

The scenery of to-day's route is beyond praise ; and everywhere the mountains and vallies exhibit the most exuberant vegetation ; the "dense forests of exotic plants," noted at p. 25 of the Geology of Kumaon ; an inexact phrase which is repeated in the map on each side of the Surjoo at Ramesur Bridge : but properly speaking, the plants cannot be said to be *exotic*, unless removed to the Edinburgh, or some other foreign Botanic Garden. Besides those of Burn Deo and Poona-giri, the beautiful Pothos scandens covers the trunks of large trees on the northern aspect of the pass ; whereas also, in the damp, half dark glens, the still more beautiful Wallichia Palm occurs in profusion (which, till the fruit was seen, I took for a Fern,) with here and there a specimen of the wild Plantain (*Musa*.) probably its utmost limit to the N. W. ; but in the glens of the Kalee and Goree rivers, near Askot, it forms whole jungles. On the southern side of the pass, especially about the Toongagar, the Thunbergia (*Hexacentris*) coccinea, called "Kul-jonka," climbs abundantly over the lower trees. Mr. Batten brought me specimens from the Doorga Peepul pass, a few miles N. W. of this, beyond which it is hitherto unknown : (since met with in the Bunlouree pass.) Towards the summit of the pass, *Cissus serrulata*

covers every rock, and *Olea glandulosa* (or *compacta*) forms a large timber tree; monkeys and *langoors** are innumerable, and no doubt a proportion of tigers to feed on them; the flesh of the monkey however is said to be too pungent for the tiger.

The Byala pass is described by Dr. McClelland to consist of argillaceous and calcareous sandstones, which Dr. Falconer has since observed to be in one spot greatly altered by a trap-dyke. The Belkhet valley consists of greenstone and dolomite; the mountains to the north exhibit green and blue dolomite in vertical strata, with hornblende slate near the Ludheea; the summits are of gneiss and granite which last Dr. McClelland found reposing on gneiss and hornblende slate on the S. W. declivity of Chhirapanee.

*The usual solitude of Belkhet is just now enlivened by considerable numbers of families returning with their cattle from the Bhabur; several parties of Darma Bhoteyas are also on the way back to their native snows, their sheep and goats well laden with cloth, sugar, sweetmeats, tobacco, and grain: not a man present with this party understands a word of Hindooostanee or Hindooec.

15th March.—To Chhirapanee, 12 miles, which took the best of my coolees 7, the worst 9 hours to accomplish: the elevation is probably from 7000 to 7500 feet, which gives about 5500 for the stage. The route penetrates the entire zone of *Pinus longifolia*, and then enters the region of *Quercus incana* and *lanuginosa*, *Androsace lanuginosa*, and similar evidences of considerable elevation. In many spots the mossy banks and *Quercus incana* were matted with *Orchideæ*, amongst which I recognized *Cælogyne nitida*, "Hurjoj," *Phaius albus*, *Dendrobium Paxtonii*, *Octomeria spicata*? "Guroor-punja;" *Oberonia iridifolia*, and several others unknown. Near Chhirapanee at a probable height of 7000 feet is a bed of *Tulipa stellata*, the most elevated spot at which it has come under my observation; its natural belt appears to be from 3500 to 6000 feet above sea-line; it certainly does not reach near the limit of perpetual snow where Humboldt places it. (Cosmos I. Note 4.)

On leaving Belkhet, the road follows the right bank of Ludeea for a mile or more, and then under a small village called Oopurkut, placed on a cultivated plateau, crosses the stream where the entire width of the glen is occupied by its channel of stones and huge boulders, the

* *Entellus.*

latter rudely piled on each other with a general dip ~~towards~~ the head of the stream. (R. S.) Here the Ludeea receives from the north a small, but brilliantly clear tributary, the Blubgoolia, up the course of which lies the road, now commencing to rise in earnest; as do the rocks on every side in vertical walls. The first crest is attained at a village called Kookrounee; hence along an undulating ridge, 2 miles to Sulla, a fit place to breakfast; there is a Deodar grove and spring called Burm, about a mile beyond this, a little down to the east. Here commences the second pull up one of the great spurs of the Kanadeo range, the Gagur of Kalce Kumaon, and only terminates about three quarters of a mile short of Chhirapanee, which lies rather beyond the highest point of the pass. The declivities on each hand during this ascent are extremely steep and deep; beyond them to the left is the Loungchoola range, connected with Kanadeo: its spacious pine-covered flanks present numerous patches of cultivation.

Chhirapanee, sometimes called Chourapanee, derives its name from a small stream which falls over the rocks here in a pretty cascade: rising in the Kanadeo summit, which may be about 700 feet above to N. E. and is estimated by Dr. McClelland to be 8000 feet above the sea. It is 24 miles due east of the Birond summit near Bumouree, and like that, is one of the Trigonometrical stations: the *Quercus lannigosa* (Reeanj) clothes the summit, which is consecrated by a neat temple to Muhadeo, invoked as "Kanadeo;" "the God with one eye." Beyond a neck, the range is continued to the east, in two more great points of equal elevation: and there appears to trend S. E. The view hence, as from camp (there is no village,) is grand. To the south, Nalee mun is conspicuous amongst the outer ranges; to the N. W. far beneath, is the broad undulating vale of Kalee Kumaon, studded with dark groves of Deodar, but otherwise highly cultivated, with the old capital of Chumpawut W. N. W. towards its farther extremity; beyond this, partially concealed by the intervening ridge of Mulsa Deo, is the basin of Lohooghat; to the N. E. is seen the precipitous face of the Thakil; and to the north, and far on each side, the snows. They assume forms considerably different from those in the vicinity of Almorah; the Trisool is foreshortened into a bastioned mass like that of Budreenath, and brought nearly into contact with Nunda Deeve; the piunacles of the Punj-choola, immediately in front,

are compressed into a cluster; while the vast groups of Dotee and Joomla appear to eclipse Nunda Deeve itself in mass and elevation. The scene is such that Muhadeo has need of both his eyes to do it justice.

16th.—To Lohooghat, about 10 miles; all descent for several miles into the vale of Chumpawut, which the road traverses for several miles—leaving the place so called to the left: it occupies a spur of the sloping western mountains, but is now reduced to a village. The rock is gneiss and granite, decomposing rapidly, and to this cause Dr. McClelland (pp. 47, 48,) attributes the desolation of the city in a passage which recalls the Burdens of Isaiah and Jeremiah against Babylon. The Almorah people assign a cause not less fanciful; according to them, the Raja Kulyan Chund, was hunting in the forest which then covered the site of Almorah; a hare chased into a thicket was metamorphosed into a tiger: which the Chaldaeans pronounced an omen so auspicious that the seat of Empire was removed forthwith, with the promise that whoever dared to hunt any of his race, would soon discover he had tigers to deal with. As might be expected the real cause originated in political motives, A. D. 1563: conquests had been made to the northwest, and Chumpawut was not sufficiently centrical. Want of time prevented a visit to the spot, where the antiquities, especially a ruined temple, are said to be interesting. Before coming abreast of its old fort, the road passes by a fine wood of Deodar trees on a rising ground, on which is a temple to Gutkoo Deotah, in whose honor an annual fair is held here; this mound is said to be named “ Koorm-achul,” Tortoise mountain, in the Skund Poorana, because in this spot Vishnoo assumed the form of a Tortoise to support the mountain Mundura, when the ocean was churned for the water of life after the deluge. The designation of the province, “ Kumaon,” is said to be a corruption of Koorm-achul; the people themselves write and pronounce it, “ Koomao:” having the reputation amongst their neighbours of being quarrelsome and litigious, one is disposed to derive the word from “ Koomun,” evil-disposed; but such a brand would scarcely be adopted by the people themselves.

The old cantonment of Goorl-chour was situated to the left of the road near Koorm-achul wood; the site was hastily deemed unhealthy from the great mortality which occurred there in 1815, among our

sepoy ; the true source of which was their march through the Burn Deo Turaee in the months of June and July,—an open valley, elevated 5330 feet above the sea, or 5830 according to Mr. Trail's estimate, with a soil composed of decomposing granite, could scarcely contain in itself the seeds of disease to such an extent. It is traversed by the Geendia, an affluent of the Lohoo river ; an easy ascent brings the traveller to the summit of the Mulsâ Déo or Makha Lekh pass, from which the station of Lohooghat is seen about three miles north ; the descent is gentle ; the hills prettily cultivated, and at their base the Lohoo flows in a deep rocky channel : it is passed by a picturesque but ricketty wooden bridge ; a little beyond this, on the left or east bank is the holy shrine of Rikhesui, prettily situated amongst cedar groves, and rejoicing in the privilege of a lingâ, which has the property of growth.

The station is a short walk farther, and occupies a pleasant tract of grassy undulating ground, sprinkled with Deodars, and the very neat and English-looking houses and grounds of the European residents. It is calculated to be 5649 feet above Calcutta. The granite of Chumpawut here disappears, and gives place to blue clay slate in vertical strata, with some quartz. The ground rises gently towards the north, and at about three miles distance is backed by the grassy saddleback mountain called Sooee in maps, but by the natives Jhoom. The summit is reckoned 7500 feet high, and Dr. McClelland quotes it at 4000, and states the rock to be dolomite ; Captain Webb at 5910, which must refer to Sooee, a ~~group~~ of villages on its western declivity or base, with a considerable tract of level cultivation, entirely in the hands of a Brahman colony, who are said to traffic advantageously with the Bhoteyas of Dhama and Byáns. The road to Pithoragurh passes between the mountain and the villages, where the slopes are beautifully wooded with Cedar.

The Jhoom mountain is continued far down to the S. E. to Khilputtee, by a level, woody range perhaps 6500 to 7000 feet high, copiously wooded with Quercus incana and Rhododendron arboreum, &c. ; on this, about 2 miles, N. N. E. of Lohooghat, Mr. Batten, C. S. has a shooting box, called Rykot, commanding agreeable walks along the park-like plateaus, with one exception that the solitary wanderer runs a good chance of being picked up by a tiger.

On a conical peak, about 5 miles west of the station is Kotulgurh, the Fort Hastings of our maps, fabled to have been the stronghold of the arrow-demon Banasoor Danava and Daitya, son of Raja or Muhabuli, who here fought with Vishnoo and his Soors, and prevailed not, though the conflict was long doubtful. No sooner was a Daitya slain, and his blood poured on the ground, than it produced a hundred others, so that the greater the slaughter of their enemies, the farther were the gods from victory. In this difficulty, Muhakalee was created, like Pandora, by general donations from the celestials, and by her were the giants at length exterminated. Amongst those who fell by her hand was Kottuvee, the mother of Banasoor, who, with a coat of mail over her bust, and naked from the waist downwards, fought like an amazon on the battlements: which are said to derive their name from her exploits and appearance, Kotulgurh being interpreted by "The fortress, the abode of the naked woman."

The existence of Banasoor in any age or place would be a matter of no easy proof, but the received traditions of India locate Muhabulipoor on the Coromandel shore below Madras, and Banasoor still further south near Devicotta; the learned pundits of Kumaon, however, locate all these wonders at and around Lohooghat, and affirm that Sooee is no other than Sonitpoor—"the red city," of the Shasters, the abode of Banasoor. The peculiarities of the soil at and around Lohooghat explain the mystery. On removing the sod, in some places a blue, but far more generally a deep red ferruginous clay is found to form the ground, and to this the people appeal as ocular demonstration of the legend: it owes its color to nothing else than the blood of the giants. During the rainy season, the Lohoo or "blood" river, is similarly discolored: and hence the name of the station. We find the same idea in the mountains of Lebanon, where

— "Smooth Adonis, from his native rock,"
" Ran purple to the sea, supposed with blood,
Of Thammuz yearly wounded."

It is amusing enough to find that Banasoor was "an inhabitant householder at Sooee, paying scot and lot, and had a house on the right-hand side of the way, as you go down the Jhoom hill, just opposite the poulters:" but to those who hold morally and metaphysically the opinions maintained geologically by Lyell and his school, viz. that forces still in operation, have produced all the exist-

ing phenomena of society, the instance of Kumaon may be instructive also. So far as his own experience goes, the European may be a Sadhu : yet, were the popular belief to guide him, he actually breathes and lives in an atmosphere of the supernatural ; a god, a ghost, an angel, a devil, a witch, lurks behind every stone and bush, and possession by them is a daily affair. All sickness is in fact considered of diabolical origin, and an approved charm for getting rid of it and pegging down the devil, is driving a wooden pin into the ground where four ways meet, and burying certain grains and drugs on the spot ; these are speedily disinterred by the crows, who really profit on these occasions, as do the principals occasionally, in virtue of the force of imagination. Last year, the common Prickly Pear, *Cactus Indicus*, was fortunately annihilated at Almorah by myriads of a species of *Coccus* : but no such evident cause would satisfy the people : the plant withered and died under the curse of a sukeer, who had suffered from one of its thorns. What appear to our western intellects, the most senseless legends, are here divine, not only probable, but certain, attested by the inspired Moonees, and perfectly consonant with the then order of nature —no small portion of which is believed to be still in force. The grave old Pundit will fall into ecstasies of admiration and approbation of the erotic exploits of Krishn, which in Europe, would place the god in the stocks. One feels the standards of judgment and moral approbation shaking under one's feet. Yet in practice, neither the understanding nor the conscience of the Hindoo seems to be seriously impaired by his reception of these puerilities. We may laugh at him as a spiritual Don quixote, but in the ordinary business of life, he is sensible and shrewd, and, generally speaking, as honest and moral as his judges. In the performance of the pilgrimages and ceremonies built on his fables, he derives a satisfaction and a merit which compensate him for the negation of philosophy. His legends would evaporate before the acid touch of Hume's famous Essay as the system of our Puseyites would fade before an honest perusal of "fiddling Conyers" free Inquiry ; but Cui bono ? in either case. On the ascent to Poonagiri, was a family returning from the pilgrimage ; the old mother trembling and crouching along the precipitous ledges—but the sparkle of the spiritual dram was in her eye, which proclaimed her conviction that she had just secured her eternal happiness. How cruel to undeceive her. "No more ; where ignorance is bliss, 'tis folly to be wise."

But these legends are also his substitute for our drama, opera, romance, novel, poem and newspaper ; and are probably in the long run as true and exact as the adventures and motives with which the western world is contented. It is more than likely that no such persons as Rám and Krishn ever lived, but what of that ? If we analyze our own feelings we shall find that Hamlet, Falstaff, Jonathan Oldback, though utterly fictitious in event, enjoy a real presence and life in our minds and speech, while Alexander and Cæsar are little more than shadows ; it was perhaps this train of thought carried beyond its legitimate limits which led the Indian writers to neglect the ordinary method of history, and adopt the spiritual romance in its stead. That the character of their heroes should exhibit what to us appear so many objectionable traits, may arise from the fact that their celestial system is so adapted to the analogies which they felt and saw in themselves and around them, that it does not recognize the existence of beings either supremely good or hopelessly bad : the former class fall occasionally like Vulcan of old into the nets of Venus, the latter, by penance, obtain the dominion of the world. There is no personification of "nature's mischief," undiluted, to be held forth as a moral beacon.

The Pauranic legends regarding Kumaon are contained in the Manuskhand section of the Skund Poorana : Mr. Batten promises a Hindee version, which would be of much local interest : otherwise their tenor will be to the effect how this saint inherited the earth by standing on his head, or between five fires for ~~so~~ many years : and that he obtained the beatific vision, perhaps the magnetic trance, by a sedulous contemplation of the tip of his own nose, &c.

There is nothing peculiar in the botany of Lohooghat, except perhaps the great abundance of a lilac Primula which fringes every stream, flowering during the winter and early spring. It is equally abundant at Chumpawut and Pithorahgurh : and pretty common at Almorah : and if not *P. speciosa*, Wall. should be distinguished as *P. rivularis*. Dr. Dollard states that *Ranunculus lingua* flourishes luxuriantly in the low marshy vallies, and is fatal to the sheep and goats which feed on it with avidity. The plant intended was probably *R. arvensis*.

17th March.—From Lohooghat to Dhurgura, about 10 miles north ; the road good, but narrow, and one succession of ups and downs.

Near Lohooghat, it passes through the Sooee ~~grove~~ of Deodar Cedars; these are extensive, and the tree has spread and perpetuated itself for ages: but neither here nor in any other portion of the province does it seem truly indigenous, being always found near temples and villages, (the oldest and finest trees by the former), and never, so far as I know, on the open mountains. Once over the Sooee heights, all appearance of undulating downs is lost, and the view resumes its usual Chaotic character; the road passes under the western face of Jhoom, which is steep and precipitous; and passes its continuation in this direction by the Kolakot ka Chheena; a little beyond which, 4 miles from Lohooghat, are the pretty hamlets of Jirkoona, perched under steep crags of dolomite, and famous for the growth of excellent ginger. To the right, Jhoom is continued to a high knob called Choomulkot, below which is a grove of Deodars called Regroo Banee, on the rounded back of a mountain, at the base of which flows the Surjoo. Passing above Barakot village, the road now reaches the Janghee-ka Kootkee, about a mile short of Dhurgura; here for several hundred yards, there is an almost perpendicular slope of grass and trees on the right, the road itself descending steeply at the same time; it was formerly a very dangerous spot, and is still not very safe: Dr. V. of the Kumaon Battalion, fell over with his pony a few years since; he had a miraculous escape, but the pony was killed. There is a small, but welcome Bungalow of two rooms at Dhurgura, which is reckoned about 5000 feet above the sea: the Fritillaria, Thomsoniana is very abundant on the Janghee ka Kootkee, and about the Bungalow, the Bauhinia parviflora, Rottlera tinctoria, Poivrea Roxburghii, Hedera esculifolia "Gursemul," &c. mark a warm site. The Phakil mountain is just across the Surjoo; its gigantic ribs, and rocky scarps, falling steeply towards the river are very fine, and reminded me of Ben Nevis as seen from Fort William (N. B.) On its western shoulder bearing E. N. E. from Dhurgura, is the Kunthagaon Bungalow, about 500 feet lower, 8 or 9 miles distant by the road, but only 4 as the crow flies: between them is the profound glen of the Surjoo river.

In the afternoon descended to the Ramesur Bridge, 5 or 6 miles distant, a considerable portion of the route pretty steep, and near the Surjoo exceedingly so. The fact of the bridges being thrown across the narrowest part of the rivers, ensures abrupt approaches. The only

level is for a mile near a recently established hamlet called Singda about half way down. From this point there is a fine view of the junction of the Ramgunga with the Surjoo, about 2 miles above the bridge ; on the right bank of the latter river there is a large patch of cultivation, above which is the small village of Ramesur : notwithstanding the name, the confluence is sacred to Muhadev, as the word is classically pronounced in Kumaon. The inhabitants complain much of the ravages of deer, which the numerous tigers,—for which the whole neighbourhood is infamous—are unable to keep down. The elevation of Ramesur Temple is only 1587 feet above Calcutta ; that of the bridge about 1500 : this, with the extreme narrowness of the glen (the river occupying its entire floor) and the thick jungle, ensures a very hot, and in the rains damp and unhealthy climate ; the people describe the heat as absolutely suffocating. The Surjoo is here spanned by a handsome iron suspension bridge, 59 paces (180 feet) over : the river forming at this point a deep green pool, in which as in the Kossilla at Dhikkolee, may occasionally be seen the fresh-water shark ? called Gons or Gonch (a species of Silurus, Dr. Jameson informs me,) said to be of an ovate form, to have no scales, an immense head, with projecting snout, frightful rows of teeth, and corresponding voracity. It attains the length of six feet, is found up the river as far as Bagesur, as well as in the Ganges at Hurdwar. The people affirm that a man was recently attacked here by one of them. There is also in the Ramesur pool a huge boulder, called Muhadev, now about 15 feet out of the water, but wholly covered in the rains. Below the Dhurgura Bungalow, *Pinus longifolia* covers the mountains, and reaches to within a few hundred feet of the bridge. Sal commences 500 feet below the Bungalow, and *Sauravia Nepalensis* (Gogunda, Gogreena), *Bauhinia Vahlii*, *Dalbergia Ougeinensis*, *Robinia macrophylla*, and *Hedychium coccineum* in profusion, soon make their appearance.* With the Sal, and reach-

* About 15 miles higher up the Surjoo, near the Gungolee or Shera Bridge, at an elevation of 2500 feet—and a 1000 feet upward, the following plants were found.

Sauravia Nepalensis.

Leca staphylea?

Cureuligo recurvata.

Wallichia Palm (*Urigthea, Roxb.*)

Hiiptage madablotia.

Sabia paniculata.

ing down to the level of perhaps 3000 feet, occurs a new species of *Rubia*, which Mr. Edgeworth has named *R. nervosa*. It has round stems, sessile lanceolate leaves, and buff-colored flowers; the plant is entirely procumbent, growing on the steep banks to the length of 5 or 6 feet, with a very large root of the finest red; it exists in less quantity on the opposite bank; neither myself nor any of my people have met it except here and 15 miles higher up at the Gungolec Bridge. Nevertheless as growing by the roadside on the only high ways in the country, it is curious it should have escaped notice hitherto; the fact proves how imperfectly we are yet acquainted with the Botany of the

- Boswellia*? "Googgur;" leafless.
- Thunbergia coccinea*.
- Piper sylvaticum*?
- Citrus Medea*? "Bejoua."
- Toddalia aculeata* "Kunj."
- Chonemorpha macrophylla*.
- Pittosporum*.
- Uncaria pilosa*.
- Evonymus N. S.*?
- Lysionotus ternifolia* (Don.) probably.
- Clematis hæsæfolia*. 3500-4000 feet not found west of the Surjoo glen.
- Laurus tomentosa*? "Kupooa-kouwul."
- Laurus lanceolaria*. "Soon-kouwul."
- Tetranthera apetala*? "Gur-bcejour."
- Ficus lamellosa*? "Gur-timla." A very shrubby sp. on the rocks along the margin of the river.
- Ficus ovata*? Don. "Bedoolee" and another, a lofty climber.
- Bæhmeria tenacissima*? "Poe," "Phoosur-puta."
- B. frutescens*? "Gur-tooshiara."
- Bæhmeria macrophylla* (Don.)
- Bæhmeria platyphylla*. { "Gurgela."
- Bæhmeria rotundifolia*.
- Bæhmeria salicifolia*. "Tooshiara."
- Bæhmeria nervosa*. "Getee."
- Procris*. Several species.
- Blumea laciniata*.
- Gynura nepalensis*: a very succulent shrub.
- Polygonum glabrum*. "Kurra."
- Amongst the stones by the river side at a temporary native bridge about a mile above the Iron one, grows a small pubescent shrub, which Mr. Edgeworth thinks is a species of *Rhabdia*. It must be altogether submerged during the wet season:—and for as long in the dry months, exposed to the fiercest heat.

mountains, and how many novelties may exist in the uncounted glens never yet traversed by the European ; the native collector is satisfied by saying (with Sheridan) he has been there. The *Rubia nervosa* would probably succeed in any of the hilly countries, if not in the plains of India.

From the Glaciers of Pindree and Kuphinee Messrs. Strachey brought me in May, 1847, a plant called "Roogee," the large tap-root of which is eaten by the mountaineers : it has a slight flavour of Horseradish ; it speedily perished at Almorah, but from the best examination afforded by very young and imperfect flower buds, it seemed to be a new species of *Actaea*. The same gentlemen also brought me from those sites abundant specimens of *Primula petiolaris*, *nana*, and another with the habit of *P. denticulata*, which I have also had from the Milum glacier, and which Mr. Edgeworth thinks new, and proposes to call *P. densiflora* : (*Primula treviscapa* N. S. Edgeworth from near Sooring) : also a new and pretty purple *Corydalis*, two new *Saxifrages*, and *Trollius pumilus*. *Gagea elegans* is a common plant near Pindree. From specimens found in seed only, I have good reason to suppose that *Trollius europaeus* grows between Rasrung and the cascades, on the south face of the Roopin pass, and would be found there in flower by any visiter in May and June.*

* Some of the plants collected towards Pindree in 1846, having had, in common with most of those enumerated in this paper, the advantage of Mr. Edgeworth's examination, I am enabled to state that the creeping Raspberry of p. 246, No. 176, J. A. S. is *Rubus nutans*. *Wahlenbergia* of Wachum, p. 247, is *W. vividis* : a specimen from a weak struggling shrub near Dooglee, not alluded to in the Journal, is probably *Panax pseudo-ginseng*, another approximation of the local botany to that of Gospinsthan. In an earlier paper on the Shatool and Roopin passes (p. 16.) I have named the "Kusbul," *Saussurea gossypina* ; but have now every reason to believe it is Mr. Edgeworth's *N. S. Saussurea sacra*. A slip in the nomenclature of the Compositæ is pardonable : most of these have as many names as a Spanish grandeé.

Several grievous errors of punctuation having disfigured the narrative in No. 176, the following alterations are very necessary to the sense.

P. 231, l. 30. For "also found," read "not found."

246, l. 2. Insert a period after "plains," and comma after Kalaputhur.

,, last line but one. Insert period after S. E. and dele it after Khathee.

256, for 1807 read 1847.

260, l. 22. Dele the commas after "Dooglee," and "Diwalce," and insert one after "hour."

,, 2. From bottom. Put the semicolon after "Nynee Tal, &c." and dele it after "3 P. M."

March 18th.—To Pithoragurh, 14 miles. The ascent northwards to Kunthagaon Bungalow, is long but generally easy, the road being well lined, the Surjoo flowing, often in rapids, immediately below. To the trees enumerated on the opposite bank may be added *Kydia calycina*, *Lantana dubia*, a shrubby *Procris*, *Gynaion vestita* "Peen," *Edwardsia mollis*, *Bassia butyracea* "Chyoora," the last in great abundance, reaching the size of a large tree as high up as Kunthagaon, 4000 feet. The name probably comes from the Sanscrit *choorn* to pound, oil impregnated with the essence of flower, pounded sandal, &c. : or from *Kshood*, to bruise, to pound, whence *Kshoudru*, "honey, bee, and *Michelia champaca* :" but the signification Bassia is unknown to the dictionaries, as is "Phoolcl," the "butter" made from the fruit to the hill people, who call it "Chyoora ka peena,"—"fat of the Bassia." The tree flowers in November, and from its blossoms and those of the "Joundela," *Aechmanthera gossypina*, which is in the greatest abundance about Kunthagaon, bees are supposed to make the best honey, and hence that of Pithoragurh and Dotee is in much request.

Basella alba, "Koee," "Belia-palung" is cultivated in some of the villages about Rámesur.

Approaching Kunthagaon, the road turns to the right up the glen of the Gunnik or Jameer (Citron) river, presenting the finest rock scenery in outer Kumaon. The torrent roars at a great depth below, veiled by the most beautiful woods : the north bank rises in a splendid facade of crags, called Baroonee or Barboree, to the N. E. of which is a still loftier and very precipitous range, called Mason and Bissar, amongst the acclivities of which are two hamlets called Jak Pooran. There are several fine cascades from the precipices, which are apparently all limestone. On the south side of the glen, the road to Pithora is, for 2 or 3 miles, carried along the N. W. flank of Thakil, falling to the Gunnik in steeps and precipices by no means agreeable to the equestrian, though the road itself is good. Kunthagaon Bungalow stands on the brink of a tremendous steep, to the S. E. of which is a lofty peaked precipice from which it is named. This supports a petty village called Goguna (Sauravia :) the distance is 17 miles from Lohooghat, 10 from Pithora. Two miles from Kunthagaon is Goon or Goorna village, where the worst part of the road is over, and there is some level cultivation. About Goon, Herbert notices

a remarkable orange-colored ochreous rock, of rhomboidal cleavage, and very low specific gravity. It strongly resembles the layers observable between the basaltic strata of Antrim, and is probably a clay-slate altered by the action of trap, a vein of which comes to the surface of the mountain a few hundred feet above the village ; at Rámesur Bridge Dr. McClelland states the rock to be Hornblende slate : above that it seemed to be chiefly limestone, with some slate and trap : and Kunthagaon stands on slate highly inclined. No allusion to the presence of greenstone hereabouts occurs in Captain Herbert's memoir. From Goon to Pithora the rock is chiefly clay-slate : this according to Dr. McClelland forms the basis of Thakil : at Pithora, the rocks are slate and limestone, the latter generally in tabular hills : at the base of Fort Loudon there are some trap boulders, which Herbert says were only detached from the crown of the hills when the works were raised about 1815.

On the road side between Kunthagaon and Goon, the *Phœnix sylvestris* is to be seen in abundance, and of all heights, from a mere shrub to a tree of 30 feet : in the Sal forests of Choubhynsia, and Poonagiri, it also grows abundantly as a shrub, as well as up to 5000 feet or more at Almorah : under this aspect, it seems to be the *Phœnix humilis* of Royle. The steeps of Thakil towards Goon are also adorned with a profusion of the magnificent *Lilium Wallichianum* "Findora," growing six feet high, and producing 1, 2, and rarely 3 white blossoms, occasionally a foot in length. The *Edwardsia mollis*, *Himālayan Laburnum*, is now in full bloom in the same spots with a shrubby ashy, species of *Desmodium* ? called "Shialet" and "Phoosur-puta," bearing yellow flowers, which I have only seen here and at Jyaree, between 3000 and 4600 feet. The *Pinus longifolia* covers all the lower Thakil, with here and there a Chestnut (*Castanea tribuloides*), of which the zone is between 2000 and 6000 feet. A shrubby *Sapium* occurs near Tholee village.

Beyond Goon, the road quits the line of the Jameer and turning a little to the right, passes up a pretty cultivated glen to Thokee, a group of villages just below a low pass, on which is built one of the cairns called "Kutputya," Thokee is the point from which pilgrims generally ascend the Thakil, by a good path. A stream which rises between the two highest cimes of the mountain here tumbles down a rocky recess in a fine cascade : it is the highest source of the Jameer. The Thokee pass leads down into the vale of Thurkot, a large village with consider-

able cultivation ; the acclivities of the surrounding mountains, cut down into cliffs, or rounded into rocky knolls, are covered with thickets of the "Runnel" *Rhus parviflora* ; its leaves blighted by the late severe snows, give the glen much of the wild heathery look of the Irish and Scottish mountains. The *Crataegus crenulata*, so abundant in Kalee and western Kumaon does not grow hereabouts : the limestone may be inimical to it.

From Thurkot, the road gradually rises to the Eichoolee ka khan (one of the sources of the Jameer) on the crest of which, to the east, lies the vale of Shor, commonly known to Europeans as Pithoragurh ; the name is said to be from the Sanscrit Swarg-arohun, "the ascent to heaven," one of the avatars having selected this route to return there. The station is still nearly two miles distant. The valley had an aspect strangely remote from any other in our territories, and in itself and the character of its surrounding mountains, brings Europe to our recollection more vividly than any other spot I have seen in Asia. At a rough guess it may be about 5 miles across, falling gently to the south-east, and bisected into north and south by a tabular ridge of slate, limestone, and greenstone, originating in the mountains to the N. W. and branching down to S. E. On the south-western exposure of this spur stands the station, now occupied by two companies of the Kumaon battalion. Fort Loudon or Pithoragurh is, a few hundred yards to the west, on a mound, apparently artificially scarped, about 15 feet high, crowned by a loop-holed wall, 7 or 8 feet high, with the barbette platforms, and broken cisterns which will hold no water ; on a commanding point to the N. W. there is a pepper box-kind of outwork, called Wilkie-gurh. The elevation of the station above Calcutta is 5547 feet. The whole valley is prettily dotted with small villages, generally placed on eminences, and surrounded by the only trees visible, except the distant forests of Bissar and Thakil. The land is often nearly quite level for extensive tracts, and is carefully cultivated with wheat, &c. The soil is a stiff clay, which, after ploughing, requires being broken up by wooden mallets. The people do not emigrate to the Bhabur, which, with the fertility of the soil, is the cause of the abundance and cheapness of provisions compared with Iphooghat and Almorah. Flour here sells for about 30 sers the rupee, when it is only 18 at Almorah, and would be still cheaper if the Bhotiyas did not carry away much ;

as for Lohooghat, the garrison and the traveller there exist on the verge of perpetual starvation ; the inhabitants appear to grow little more than they require for themselves : and when the whole regiment was quartered on Eastern Kumaon, the glaring violations of the free trade system were so frequent and extensive as to lead to constant dissatisfaction and almost open conflict between the pinched soldiery and the oppressed peasantry ; affairs will now improve, as Kalee Kumaon has but to support two companies, aided by supplies from the plains.

Each section of Shor valley has its stream : that to the south, named Chundurbhaga, flows along the south end, and, joined by the branch from the N. W. forms the Okul of the map, escaping south to the Kalee by the temple and glen of Choupukhya. The outline of the enclosing mountains is extremely bold and varied : their sides sloping and grassy in some parts, steep as walls in others. To the east is the Durge range, about 7000 feet high, connected on the N. with the remarkable summit of Dhuj, upwards of 8000 feet high, with a contour exactly similar to a section through a parapet. S. S. W. is the long ridge of Thakil, with its three summits, the northern aspects still showing a few patches of snow. To N. N. W. are the mountains over which goes the direct road to Almorah, (viz. Bans, 9 miles : Gungoleehath, 13 : Nynee, 12 : Punwanoula, 10 : Almorah, 11,) and N. N. E. is a bold and lofty cone, the Kotesur ka Devee, but better known to the English residents as the " Drill" hill. It is reported to bear this last appellation from the tradition that in days of yore, Colonel S. S. was accustomed to punish delinquents in his regiment by ordering them to trudge, in full panoply, to the top of this mountain, their commanding officer, telescope in hand, superintending the distant penance, in his own veranda ! The " Present Arms" was the signal of its accomplishment, and poor Jack, " remote, unfriended, melancholy, slow," returned to his lines a wearied and reformed man.

In this direction runs the road to Byans ; the Chipula mountain, 13,500 feet high, the last ramification of the Punch Choola, closes the horizon, which has now become so hazy that the snowy range is barely visible.

About 16 miles east of Pithoragurh, the Kalee is passed by an Iron Suspension Bridge, the boundary between the British and Gorkhalee territories, where each nation has a guard. The river is said to be

there confined to a very narrow width between limestone cliffs. Dr. McClelland found precious serpentine at Goorat village, on the way down from Pithora.

The people of Shor have a general impression that the prevalence of goitre in their valley is owing to the presence of so much limestone ; and one may occasionally hear a hill man object to Nynee Tal on the score of the water there being impregnated with lime. Dr. McClelland has adopted this opinion (apparently first broached by Mr. Coxe, in reference to Switzerland) and endeavours to prove by an induction of particulars, that where the springs are in limestone, the disease prevails : where in slate, that it is unknown. The evidence adduced is certainly startling, but who is familiar with a whole country such as Ireland, three-fourths of which are limestone, and where goitre is unheard of, one cannot but suspect a fallacy, especially as the disease is exceedingly prevalent in some of the gneiss and mica-slate districts of Busehur. It was the fashion at one time to ascribe goitre to the use of snow water ; a theory which was overthrown by the discovery that the disease was known where snow and snow-water were equally unheard of ; by parity of reasoning the theory of lime-water must be relinquished, if it be proved, as I think it may, positively, that goitre affects many slate districts, and, negatively, that it is unknown in limestone ! There is not a trace of lime at Almorah, yet the malady has shown itself there in several Sepoys, natives of the plains, as well as in European children, none of whom could have had any hereditary predisposition ; Dr. Ballard found the case the same at Lohooghat.

March 20th.—From Pithoraghur to the N. E. peak of Thakil mountain, which took nearly four hours. The route strikes off from the Eichoola Pass, and, crossing a range of little height by a gap with several old Sillung trees, enters the large, level, and beautifully cultivated valley of Deodar, which appears to join that of Pithora towards Choupukhya. The vista down this valley and across the Kafra amongst the Dotee mountains, is exceedingly beautiful. One of these last, with a double head and very lofty, is called Bhaga-ling ; near it is the Sheonath Quarry, affording a very hard, black-stone, in much request for millstones.

The Deodar valley crossed, the ascent commences in earnest up the N. W. side of the mountain, at first steep, rocky, and inaccessible to a

pony, but afterwards more gentle. The only plants in flower were *Saxifraga ciliata*, *Gentiana marginata*, and *Primula denticulata*, the last high up, in wonderful profusion and perfection. In the upper 1500 or 2000 feet, large meadows occur of the tall hairy grass called "Salim," *Rhaphis Royleana*, common also on the Gagur, Binsur, Bhutkot, &c.; it is considered the best material in the mountains for thatching, a comparatively thin layer of it, especially if used when fresh cut, being said to exclude water perfectly. My people fired these meadows in several places, when it was surprising to observe the rapidity with which "the tongue of fire" licked up the tall bending culms, and speedily enveloped the mountain side in a mass of flame eating its way down and against the wind as well as up and with it. The amusement was safe up here, but lower down might be fatal; it is only a few years ago that a party of eight or ten fiddlers (meerasées) on their way to Pithoraghurh were overtaken on the high road between Goong and ~~Ko~~kee, and suffocated to a man. In addition to the accidental friction of bamboos, &c. the mountaineers believe that these fires are sometimes let by the sparks elicited by falling masses of rock, *Arundinella hirsuta* is a very common grass on the S. face of the mountain from 6000 to 7000 feet. The ash-leaved Berberry, *Berberis*, (*Mahonia*) *Nemoralis* "Pande-Kilmora," or "Chotra," is a common shrub on the upper Thakil: and, in the woods as well as on the open downs, various species of *Cherayuta* spring up in abundance, as if nature had here opened a druggist's shop for the cure of the fevers which her agency induces in the Turaee below; a dualism of operation which reminds us of the experiment recorded by Dr. Braid, who, magnetizing the organ of philoprogenitiveness on one, and that of destructiveness on the other side of a young lady's head, was embraced by her with one hand, but knocked down with the other. For an effectual cure of "life's fitful fever" itself, the mighty mother despatches us to the limits of perpetual snow, where she produces her aconite, and sweetens its root as an earthly mother does the medicine for her children; if, with Macbeth, you "gin to be ~~awary~~ weary of the sun," as well you may in India, swallow but a small dose of this, and

"Nor steel nor poison,
Malice domestic, foreign levy, nothing
Can touch you farther."

But the glory of the Thakil mountain is its Palm, *Chamærops Martiana*, to which it is also indebted for its name ; it commences at about 6500 feet, but reaches its perfection in numbers and size towards the summit, where, at about 7800 feet, it occurs, chiefly on the N. W. aspect in clusters and lines, growing from 20 to 30 feet high, with a superb crown of dark fan-shaped leaves. rattling loudly to the breeze. To the Anglo-Indian, who associates the Palm with heat, sea, and level plains, it is startling to meet one thus, growing on the mountains above the Pines ; with, and actually above, the Holly, Maple, Oak, Yew, with beds of Primula at its foot ; it is in botany what in zoology would be the lamb and the lion feeding together. The fact, however, has its parallel in America, where in about 4° north, on the Andes of Quindiu and Tolima, Humboldt discovered the *Ceræxylon Andicola* at from 5800 to 9500 feet elevation. "The association," says this illustrious traveller and philosopher, "of Palms and Coniferae which we have noticed in the coal measures continues through all the succeeding formations, until far into the tertiary period. In the present day, it may almost be said that these families avoid each other's presence." Yet he states that on the western slope of Mexico, *Corypha dulcis* is mixed up in forests of *Pinus Occidentalis*. At Dwarahat, elevated 5000 feet above the sea, *Phœnix sylvestris* flourishes as a large tree, with *Pinus longifolia* all around. Baron Humboldt, no doubt from the imperfection of his materials, appears to have had an inadequate idea of the Himalayan palms : he says ((*Cosmos*) "scarcely is a single palm-tree found so far north as the beautiful vallies of Kumaon and Nepal." Yet Dr. Griffith enumerates *Licuala peltata*, *Wallichia oblongifolia*, *Areca gracilis*, and several more, as natives of the Darjeeling mountains ; others will probably be added to the list whenever the great belt of richly wooded mountains thence to Kumaon, has been explored ; just now, it is not better known than Timbuctoo. Dr. Griffith distinguished *Chamærops Martiana* by its superior stature and yellow fruit from *Chamærops Khasyana*, which he describes as a low tree, with blue fruit. The last is that of the Thakil Palm, but the stature of the trees fully equals his measure of Ch. *Martiana*. If the color of the fruit be taken as the test, we have here this second species of palm, adorning a range 8000 feet above the level of the sea ; 4000 feet lower, *Phœnix sylvestris* is in abundance ; while, at the base of the mountain, the hot, but

shady dell of the Surjoo is in many places a thicket of the *Wallichia oblongifolia*, which has been traced from Bumouree to Assam.

Linnæus classed the Palms as the "Principes," of the vegetable kingdom, and with all subsequent Botanists, places them near the grasses : it is not a little interesting, then, to find that, perhaps before Sweden emerged from the waves of the sea, the Indian writers had designated the Palm, "Droomeshwur,"—Sovereign of trees, and "Trinraj," King of the grasses : (*Borassus flabelliformis*.)

There are some trees of *Mesua ferrea*, Nagkeshwur, in Dotee opposite to Askot ; the people, with botanical rivalry, boast that Kumaon has none, which is true enough. The Gorkhas tell me that the *Chilounia*, *Gordonia integrifolia*, is abundant in the mountains to Thansen (Palpa,) but no farther towards the N. W.

The Thakil mountain is generally, in Shor, known as the Thul-kedar, which one might be inclined to refer to the growth of the Palm, Tul or Tal ; but the word really comes from its Sanscrit name, Sthul-kedar, "the station mountain," or "place of the sign," from a not very remarkable temple of Muhadev, which crowns the N. E. summit. The ridge here is composed of crags of a compact reddish-purple dolomitic limestone, which indeed forms the whole upper mass of the mountains ; in the main summit, about a mile to S. W. this rock is of a pale blue color, distinctly stratified : the beds flush with the surface, and only supporting a scanty vegetation of grass and Gentians ; the strata seem to dip here to the S. E. and on the S. W. prolongation of the mountain, crop out in precipitous tiers, in one locality greatly contorted. At the temple the dip of the strata seemed north or N. E. : the whole mass is pervaded by layers of chert, or hornstone, as Herbert calls it, which resist decomposition much longer than itself, and project in bevelled cornices ; as in the limestone of Shalee mountain near Simla. Between the hut and the main summit there is a mine of very compact steatite, of a much better description than that in the dolomite of the Ladder Hill above Bagesur. The loftiest point of Thakil is 8221 feet above Calcutta ; between it and the temple is a col, perhaps 400 feet deep, in which, sheltered by some fine oaks (*Quercus dilatata*), Major Drummond has a shooting hut, which saves the labour of bringing up tents. The abundance of wood and grass in the mountains affords great facilities for the construction of these

accommodations ; the people of Shor are also peculiarly skilful in the manufacture of mats, chiks, baskets, &c., from the Nigala Bamboo, which grows copiously on Thakil.

The Thakil mountain is an enormous mass, perhaps not less than sixty miles in circuit at the base, and, towards the summits, affording ample scope, at good levels, for extended roads and paths. Each of the summits sends down a huge buttress to the S. E. between which lies a broad, undulating valley, with Burabagh village on its north side. Still lower, in the district called Goomdes, is the confluence of the Surjoo and Kalee at Puchesur, a spot sacred indeed, and celebrated amongst fishermen for its Muhaseer, but so hot and narrow as to be uninhabitable. To the west, the main range is continued towards Goong, in another great spur, expanding near its origin, into broad wooded knolls, and then changing into a very narrow rocky ridge, with grassy, but extremely steep shelves to the south. This stretches to Kunthagaon, but above Goong is broken by a deep neck, the Lutkhola Binaik, the upper flank of which turned out so steep as on the 21st to force us down on Goong by a secondary ridge, itself sufficiently steep, and slippery from the dry grass and pine-leaves, to ensure repeated falls.

The haze which now shrouded Kumaon barely enabled me to judge what the view from the Thakil must be with a transparent atmosphere ; even the natives, not often enthusiastic on this point, speak of it with admiration, and tell how, in the rains, it includes a mighty expanse of the Rohilkund plains, with all the exterior, the central, and the culminating ranges of the ~~m~~itudinous ^{the} Himalaya, seen from this Mercury station with all the advantage and pride that a General reviews his long line or massive columns of holy bayonets, glittering sabres, and clouded artillery.

The Thakil crags and forests are a favorite haunt of the wild Boar, Bear, Ghorul, Jurao, Kakur, also known as Rutwa, and other deer. The wild dog pays the mountain occasional visits, and has been seen by Major Drummond forming a regular semicircle about its prey, a female Jurao with her young ; and, on an evidently concerted and well understood signal, starting after them in full cry. Amongst the oak woods I noticed flocks of a large pigeon much resembling in size and color the English woodquest ; they are called Bujewa and Lekhwal, and appear to be the Columba Palumbus of Dr. McClelland ; the wings are of a slate color, barred with white : the breast, purple or

puce-colored, the back of the neck, brownish. Their food is the acorn of *Quercus incana*, which is equally relished by bear and *langoor*; they are common in Kumaon at similar elevations. The Alpine Lammergeyer (*Gypaetus barbatus*) "whose happy flight is highest into heaven," soars majestically along the precipices; its Kumaon name is Reeshee, and the people here and in Gurhwal generally identify it with the Guroor or Bird of Vishnoo; it probably is the primitive "vehicle" of the god; but at Budreenath, Guroor is represented by a winged boy, a Himalayan Ganymede.

March 25th.—From Lohooghat to Furka, 9 miles: road good, at about 4 miles passing immediately below Kotulgurh or Fort Hastings, to the south, and perhaps 600 feet lower. The elevation of the fort above Calcutta is 6327 feet; it occupies a steep knoll, 150 to 200 feet above the general level of the mountain, separated by a deep neck from a plateau to E. N. E., on which stood an outpost called Rounj, from which Kotulgurh could be easily battered. The area comprises a tract about eighty yards from N. to S. and twelve or fourteen from east to west: surrounded by a good stone wall eight to ten feet high, and five thick. The gate is on the E. N. E. side: and there is a postern at the N. W. angle. There is a deep reservoir, but no water in the place; the nearest supply is under Rounj to the S. E. a mile distant: there is also a small spring to the west; were the reservoir water-tight, and filled, the position, though somewhat open to escalade, would be rather a strong one; except from the east, the approaches are extremely steep. The garrison consists of a ~~nick~~ and four Sipahees, retained simply to protect some spare timber, &c.; as the spot affords no supplies they depart daily to Lohooghat for their dinner, and assured me that the stronghold of Banasoor takes very good care of itself; it is destined to be dismantled shortly. The place was intended to command the very pretty and extensively cultivated valley of Bisong, which, with its groups of villages and clumps of trees lies below to the south and west. In the fields Papaver glabrum, Tulipa stellata, Ranunculus arvensis, and Lotus corniculatus by the streams, are very abundant, the first two and the last now in full bloom. A gentle ascent leads to the head of the glen at a fine Deodar wood, sacred to Dernath Devee. Here the slate rocks change to granite, which continues to Furka, mostly in a state of complete disintegration. Hence

the road generally keeps to the ~~summit~~ of the ridge, from which the ground slopes easily to the south, forming a series of open valleys, beyond and parallel to which rises the Sidh ka Dhoora range and Chuloun summit, about 4 miles S. of Furka, covered with *Quercus dilatata*, which also occurs at Furka and along the road side, especially a large grove at Dana near Dernath: descending hereabout~~s to~~ 5800 feet, probably its lowest level a mile beyond Dana is Lullia, a ruined temple, with the usual cedars: here a large treasure is reported to have been discovered. Furka Bungalow is above a mile on, and here is another and very beautiful cedar wood. The elevation is 5827 feet above Calcutta: there are many villages scattered over the neighbouring dales, the nearest of which are Maragaon and Kumlekh. The inhabitants are all still in the Turaee, and I visited several of the hamlets without meeting or seeing a single person: all the doors locked, and the crops apparently uncared for, but luxuriant: one is at a loss to know how they escape the deer. Much rice is grown in the swampy bottoms: the streams join the Ludheea at Kela Ghat.

March 26.—13 miles to Devee-dhoora, the Deo Dhoora of the map, often known as Dé simply: road good but tortuous, following the tabular and rounded summit of the granitic range; this is well grown with Rhododendron, Cheer Pine, Pear, Kaephul (*Myrica sapida*), and Banj oak which with its young hoary leaves well justifies the epithet *incana*. Those of *Quercus dilatata* are now of a beautiful glossy brownish yellow and pink; but though the mountains are loftier than towards Furka, this species does not occur on to-day's route. The road descends at once from Furka Bungalow for 1½ mile and then ascends as much to the temple of Eiree and Ahree Deotah, with the village Guhtora below to the north. Ahree is one of the most popular of the minor and probably aboriginal gods of the mountaineers, such as Symdeo, Nagnath, Hurroo (Hurjoo, or Mahumbulee,) &c, whose rustic shrines are met in every grove and on every summit; they are now considered to be men of the Golden age, deified for their many virtues and powers, and so far answer to the classical daemons of the Greeks as defined by Hesiod. The *Dies Irae*, some time in October, is kept as a fair, and is celebrated with feasting and dancing: during the revelry, the demi-god, aided by bhang and churrus,* seizes and takes possession of one

* Intoxicating products of hemp, *Cannabis Sativa*.

of the party, who, half drunk, half inspired, and wholly mad from excitement, is supposed to acquire the gift of prophecy, the power of revealing the place and agent of stolen goods, the seat, cause, and cure of diseases, &c. Ahree, a mighty hunter, armed with bows and arrows of steel, presides over ordeals, and it is said that an oath taken in his name is held in great reverence. The true name of the peak near Somesur, called Ihooee Deo in the map is Ahree-Deo : Raee peak in Gungolee is also sacred to this hero. At the 6th mile from Furka, the road passes a cedar grove and shrine called Patee Jounlaree, with the village and valley of Keemwaree to the south ; the soil is undulating, but apparently poor, consisting of granitic detritus. The streams in this direction from the heads of the Ludheea ; between the two main branches, in the Dhyanee Rao purgunna, are the Nai iron-mines considered the best in Kumaon ; apparently the "Muglig" of Herbert : the ore is magnetic. At 4 miles from Deo Dhoora, the road descends to a deep col called Gursa Lekh, with the village Goom Gursaree below to the left : hence there is a considerable ascent to Deo Dhoora, 6867 feet above Calcutta, a remarkable spot, where on the N. W. face of the mountain, a few feet below its crest, there are two groups of colossal blocks of gray granite, piled on each other in the Titanic style proper to the rock, consecrated to Muhadeva, Devee, Bheemsingh, and softened by a few picturesque cedars, oaks, walnuts, and a large Sillung tree. Similar boulders are strewed over the surface of the surrounding mountains, especially on the upper part of the deep depression in the range, immediately north. Between two of the main boulders, in a Druidic recess, is the temple of Muhadev, and the place of sacrifice, where, as at Poonagiri and hundreds of other Indian fanes, innumerable goats and buffaloes are yearly offered, to the confusion of archbishop Magee and his sect. Neither of these rocks is probably much under fifty feet in height. A little to the west are two other boulders, the uppermost of which called Runsila, about one hundred feet in length is cleft right through the centre by a deep fresh-looking fissure : at right angles to which there is a similar rift in the lower rock. On Runsila rests a smaller boulder, said to be the same that was employed by Bheemsingh to produce these fissures, in proof of which the print of his five fingers is still pointed out, just as at Rephidim the twelve sources whence the water gushed from a similar mass are exhibited to the credulity and the

kisses of the faithful. The surface of Runsila also presents certain other marks and diagrams, on which the gods amused themselves at whist, pucheesee, &c. Both boulders and fissures are indeed sufficiently extraordinary to warrant some superstitious legends in an ignorant population. Humboldt adopts the opinion of Von Buch that these wildernesses of granitic boulders, as well as the fissures, originated in "a contraction of the distended surface of the granitic when first upheaved." McCulluch, Herbert, &c., seem more inclined to attribute the boulders to the existence of hard and highly crystallized nuclei, which have resisted the decomposition going on all around, caused probably by the action of water on the superabundant felspar. Many of the boulders are also perishing, but somewhat differently; large and thick concentric coats scale away, and crumble, by the process which Herbert terms, "desquamation," which is equally remarkable in the trap rocks. The fissures appear to be too fresh and sharp to allow of the supposition that they are coeval with the elevation of the rock: they are probably due to the unequal cooling of the mass when a frosty night has succeeded a very hot day.

This granitic ridge extends continuously from Dernath near Fort Hastings to Sour Phutka, within three miles of Dol; Herbert's map gives a wrong idea of its area by a single patch only: at Sour Phutka the road leaves it, but the formation is probably continuous to Syalce Devee, as the granite reappears on the west and south faces of Bandunee and Motesur mountains; in the bed of the small stream which joins the Koomri below Peorah, and on both sides of the Koomri up to Kupleshwur. In this great outburnt of granite in central Kumaon, and the equally important one of greenstone along the line of the Gagur, we are probably to seek the true origin of the curious reversal of the dip by which the gneiss and mica slates of the snowy range have been brought to rise towards the plains. We may suppose that the primitive eruption of the granite in the snowy range originally raised them more or less parallel to itself: and that the subsequent outburst in central and outer Kumaon, forced out laterally by the resistance of the main range, tilted up their inferior edges into the extraordinary position in which we now see them: (T. E. S.). Isolated instances of the original dip remain to countenance this view: thus Binsur and Jagessur mountains are composed of gneiss and mica slate in highly in-

clined strata dipping from S. S. W. to S. S. E., and crossing out on the north face of the mountain in steep precipices facing those of the Khurei limestone across the Recthagar, of which the dip is N. 60° E. The lever at Binsur was apparently an eruption of syenite, which has reached the surface at the gorge of the temple. Eruptive rocks seem in fact to abound all over the province: Major T. E. Sampson detected a great outburst of trap near Chandpoor, south of Kuruprag, on the route from Almorah to Budreenath: at Dhamus, on the declivity of Siyaahee Devee, a dyke of greenstone, about one hundred yards across, separates the mica slate from the granite, which there forms the upper part of the mountains. It is rapidly disintegrating, and is arranged in concentric layers of very considerable diameter, each with a hard spherical nucleus: numbers of these lie about, exfoliating more slowly, and forming those natural boulders so abundant and troublesome on the trap plateaus of central India: the operation of fire thus operating as water does in the case of river boulders. Strewed on the surface of this dyke there are many cuboidal masses of an extremely hard and sonorous black hornblende rock, from which the spot is known as Kala-putthur and Tipooria Putthur "The Peeling stones."*

There is no village at Deo Dhoora, but the Poojaree, an importunate beggar, has a respectable house, about which there is a collection of slated huts, for the convenience of the many pilgrims who assemble to celebrate the annual fair in September. On this occasion it is or was the custom for the people to form into parties which fought with sticks and stones, with a not unfrequently fatal result, and all in honor of the presiding goddess. Such combats answer in society the part of Cowper's "animated No" in conversation; and in this case were doubtless the escapes and safety valves of the spirit of litigation for which the people of Kumaon are noted. It seems to be in truth almost their only serious defect, and no where does one more frequently hear complaints of the meshes of the law: "Jal-sazee." This state of things is an unavoidable result of the law of inheritance, which allows the sons "share and share alike" of the father's property; so that

* I observe that Dr. Royle confounds Wangtoo Bridge in Kunawur with Whartoo (Huttoo) near Simlah: the latter mountain is gniss; but at Wangtoo, the Sutluj has cut its way through a mass of the hardest granite.

houses and lands are divided ad infinitum into the most intricate multiplicity of parcels, so small as scarcely to afford a livelihood to the owner, and yet absolutely necessary to his existence ; emigration being precluded on the one hand by the snows, on the other by the heats of the plains. The result is shown in the extreme anxiety of numbers to obtain employment under Government or with residents of the province, as well as in the amount of litigation and heart-burning concerning boundaries and succession ; yet so pacific and honest are the inhabitants generally, that one travels almost for months without meeting police of any kind, their democratic institutions as to property going hand in hand with the most absolute principles of monarchy and implicit obedience. Instead of shooting their landlord, the custom in Tipperary, they merely file a suit against him : it is difficult to meet one who has not some little affair of this kind on hand. The right of primogeniture is only acknowledged to the extent of perhaps a cow, or the most auspiciously situated tract of land, being given to the eldest son :—daughters appear to get nothing beyond a husband.

Deo Dhoora occupies the N. E. and highest angle of a great granitic plateau, steep on the east and north, but sloping gently to the west and south : it is covered with wood, and furrowed by deep ravines. One of these commences at the shrine, and soon collects a pretty stream, deeply shaded by horse-chestnut and other trees : at its head is a Noula or covered well, now in process of repair ; the artificers of Kumaon being all of the outcasts called Dooms or Doomras, no Brahman, Rajpoot, or man of any good caste will touch the water till the well has been carefully purified by sacrifice and prayers. None of this proscribed race dare openly to drink of a well appropriated to the privileged classes : nor, under the native Governments were they allowed to build temples, to have marriage processions, to mark themselves with the teeka, all of which they now practise with impunity : and they may console themselves for their exclusion from the springs by the fact that at Almorah the Christians and Musalmans are in precisely the same humiliating category. Against these Helots it may be justly charged indeed that they are in their food, persons, and habitations, disgustingly filthy : scarcely anything comes amiss to them, and they appear indifferent as to whether themselves or disease have the killing of their meat ; fowls, pigs, cows, being equally acceptable. They h

even different deities from the Hindus, who merely bestow a faint recognition of respect on passing these Dii minorum gentium. The chief of these is called "Nurungkar"—"the maker of men," to whom they offer hogs, fowls, and other unclean things, a practice which may indicate a connection with the non-Hindoo races of the mountains and forests of India. They also hold the demigods Hurroo, Sym, &c. in great veneration. A common tradition relates that the Dooms once gained the mastery of the province, and established a *leather* coinage : *Aesop's* fable in operation ! The view from Deo Dhoora is celebrated as being one of the finest in Kumaon : it includes Thakil, Jhoom, Binsur, and a host of nameless ranges to the west and south ; the snows were but dimly visible through the haze which has set in unusually early this season, and, while it lasts is a most effectual "*Burke* on the sublime and beautiful." Its origin is disputed ; some consider it to be fine dust blown up from the plains, the winds restoring to the mountains what the waters have carried away, or a portion of it : but having observed that the atmosphere is little if at all cleared by heavy falls of rain at this season, I should say it was more justly considered to be aqueous vapor, in the state which Professor Forbes calls "dry haze." Early in August 1847, after a very wet July, which (to adopt a conceit of the Edda), must have converted the *dust* of Hindooosthan into its brother, *mud*, the haze returned as dense as before, so as to obscure every object beyond a range of four or five miles. The ordinary termination of this Egyptian darkness is the commencement of the wet season, the intensity of the vapor, whatever it consists of, increasing up to that period.

Deo Dhoora, 6800 feet, is the highest, Kupkot on the Surjoo, 3400 feet above the sea-line, the lowest level at which I have observed the Silung ; flourishing, however, at both points, so that its limits may safely be extended a thousand feet more in each direction. Mr. Edgeworth thinks it is *Olea acuminata* var. *longifolia* : and the Almorah Pundits inform me that it is the Shileendruh of the Sanscrit scriptures. H. H. Wilson merely defines the word "a sort of tree," and does not give the etymology, which seems to infer "holding a stone," or "firm in stones ;" in allusion either to its druped fruit, or to the stone seats which are usually built about its base, for the accommodation of the Himalayan Wittenagemoles.

A few hundred yards down the S. W. glen here, we also find the pretty and interesting twiner, *Gardnera ovata*; also growing in similar localities on Siyahee Devee, near Almorah: the people are little acquainted with the shrub, which seems not common, and term it, "Bunjahee," or wild Jessamine. Having examined numerous specimens in flower and fruit, the Kumaon plant I should say combines the characters of Dr. Wallich's two species, *G. ovata* and *angustifolia*, but differs from each in having a two-celled berry, with two seeds in each cell.

The pretty little *Geranium bicolor* (Royl.) now in full bloom, is abundant at Deo Dhoora.

27th March.—To Dol Bungalow, 17 miles, a distance which to the solitary traveller appears so long, that he is apt to enquire with Paddy uncoiling the rope, whether some one have not cut the end off. Last evening, about 7 o'clock, a tremendous storm of lightning, thunder, wind and rain, from the west, burst on Deo Dhoora, and seemed for a while as if it would annihilate the everlasting mountains. The flashes of lightning were constant and most vivid for about an hour; and the rattling peals and roaring of the thunder, reverberated from a thousand points, were terribly sublime. The rain continued all night, and several smart showers fell during the day, with most boisterous and English-like gales, veering from W. to S. E.: the scudding clouds adding a thousand fresh tints and changes to the nearer scenery, but all beyond was as obscure as ever.

On quitting Deo Dhoora Bungalow, there is a steep descent of 1200—1500 feet to the Kotahgar, the central feeder of the Ludheea, and the boundary between Kalee Kunnaon and Almorah. A large village, Waree, is seen far down on its banks; about this spot, Celo-gyne procox will be found on the trees, blooming in November. One of the sources of the Punar, which is apparently the true Kotagar, a large affluent of the Surjoo, rises in the same depression, and affords a path down towards Doongra, another considerable village. Hence the route ascends gradually and for a long way, the opposite side of the Col, the summit of which is called the Berchoola, along which it undulates, winding terribly, to Dol. The scenery is beautiful, and must be grand indeed when crowned by the snowy range. The mountains are heavily wooded with *Quercus incana* and *dilatata*, *Rhododendron*, *Andromeda*, *Millingtonia pungens*, *Photinia dubia*, *Myrica sapida*,

Carpinus viminea, *Betula cylindrostachya*, *Evonymus japonica*, *Eurya acuminata*, and the level is high enough for *Primula denticulata* and an occasional yew, denoting a greater elevation than that of Deo Dhoora: though this northern tree descends occasionally in Kumaon as low as 6000 feet. The thickest and most luxuriant woods are on the northern aspects, which are exceedingly steep along this range, where the poor granitic soil is covered by a deep layer of black mould. *Cupressus torulosa*, under the name of *Rai-sulla* is reported to occur on the southern declivities.

At perhaps seven miles the road passes Puya Panee, "cherry tree water," a lofty, and to-day a cold bleak spot, the head of the Ludheea river. At three miles short of Dol, the route decends to a second *Col*, called Sour Phutka, the Sarput ka dhoora of Herbert: there are pools of bad water here, and the people of Salim are clearing large tracts of the mountain forest for wheat and barley: such land is called "Ijur," and being often temporarily abandoned after two or three years' cultivation, produces the erroneous impression that the agriculture of the province is retrograding, more disagreeable settlers than those from Salim, are not unfrequently met, in the feline form, on the route between Sour Phutka and Devee Dhoora; but they rarely approach much nearer to Almorah.

At Sour Phutka, the granite rock ceases, and is succeeded by the stratified rocks quartzose, micaceous, and slaty, dipping north. About Dol, these are completely established, with abundance of the black graphite slate, so common on Kaleemuth, Bandung, Devee, &c.; the presence of this may probably be connected with the neighbourhood of the granite.

A mile beyond Sour Phutka, the road passes an extensive wilderness of vast angular gneiss fragments: perched on the top of a group of these is a rudely conical mass of the same material, 20—30 feet wide at the base, and fully 50 feet high: it is called Nagdeo, and seems to be revered as a phallus: the foundations of old buildings are visible around. A rivulet, one of the heads of the Pumar, rises a little way down, between these boulders and the high road; following this for a mile, we come on a small and exceedingly pretty secluded dell, shaded by cedars, horse-chestnuts, and Tilonj oaks, with a fane sacred to Vishnoo, and several houses, untenanted at present. A path leads

hence direct to Dol, situated in the Murhoree Putee, which includes Peorah, and belongs to Kedarnath temple.

Dol is a petty hamlet on the spur below the bungalow ; still farther down, in the various glens to the east, are scattered the villages of Salim, celebrated for its excellent rice. A little north of the bungalow, rises the eastern branch of the Koomria river, with the road to Almorah, on its right or ~~eastern~~ bank; 3 coss from this, at the junction of the S. E. or main branch, stands the rather famous shrine of Kupleshwur, with a large temple of Muhadev, built by Oodiot Chund, son of Baj Buhadoor, on the north bank at the exact spot where Kupila Moonee did penance in days of yore, kept in countenance, across the junction, by no less a personag. than Seshnag, the serpent king, who was similarly engaged. There is scarcely a confluence of two streams in the mountains, where, for a recondite reason, Muhadev is not worshipped. The present site is a narrow Pine-clad glen, just at the end of the cultivated lands ; a mile lower down, the Koomria forces its way amidst great smooth boulders of granite, the debris of the mountains above ; here, on its south bank, facing Roulakot, is a huge outburst of granitic masses, piled one over another to the height of 150 feet ; the highest and most external, shaped like the beak of an anvil, is known as the Birdco. The place is about four miles from Choumoo village, near Dheekot, between Almorah and Peorah. Placed thus at the fountains of water, Dol also merits a temple to the winds, which blow here so generally and strongly that one is tempted to believe an enemy must have sown the Hornbook of storms under the foundations. A Buniya presides here over a temple of Ceres, in which the worshippers are earnest and numerous.

28th March.—To Almorah, 15 miles : the first 9 pretty level, and then a dip of 2500 feet from Bandunee Devee to the Suwul river, and a rise of 1500, by a bad, rocky, warm road, to Almorah. About six miles from Dol, leave that village, a little to the south, 6200 feet above Calcutta ; soon afterwards Almorah comes into view from the ~~pe~~ called Goona Panee, by which we enter on the north face of Bandunee Devee mountain, and lose sight of Kara Deo, Jhoom, and Thakil. Fifteen or twenty years since, all this was thick forest, but the hewers of wood from Almorah have now left little beyond some scrubby oak, Dul (*Cedrela serrata*) *Rhus semialata*, an unknown olea with very bitter

leaf, with a copious brushwood of *Elsholtzia polystachya*, *Berberis aristata*, *Deutzia Brunonianana*, *Spiraea*, *Symplocos*, *Clematis montana*, and a new species of *Xanthoxylon*, (*tomentosum*, *Edgeworth*,) called "Seemoor," which grows here and on Boodha Jagesur, in profusion : the whole in autumn closely matted with the odoriferous *cuscuta grandiflora*, and the ground covered with wild Thyme, *Chirayuta*, &c. About a village called Rurown, north of the road, occurs the yellow-flowering *Artemisia vestita*, called "Deopatee," from its superior fragrance ; it is a common plant in Joobul, towards the Choor mountain.

The road passes from 200—300 feet below the Bandunee summit, which, seen as a peak from some points, consists really of a level oblong area, 150 to 200 yards by 20 to 30 ; it is 6800 feet above Calcutta, and with its oaks, is consecrated by a temple of Devee, in front of which is one of those tabular stone altars on four low pillars, called *Choukootiya* in Kumaon ; they closely resemble the Druidical cromlechs, and are used for the sacrifice of goats, the deposit of flowers, &c. : nor will any Shikaree pass a shrine of this sort without some small propitiation to the Indian Diana to send him game and good luck.*

The view over Kumaon from the Gagur to the snows is exceedingly fine from Bandunee Devee, and Almorah town is hence seen to the greatest advantage. During the rainy season, the phenomena of diverging rays opposite to the place of the sun may commonly be witnessed of an afternoon towards this mountain. According to Professor Forbes, writing of the shadows of clouds, mountains, &c., projected to a great distance in the air, and rendered visible by imperfect transparency, "the diverging rays so often seen proceeding from the sun, when near setting, are of this kind : and the corresponding fact of rays (or clear intervals between the shadows of clouds), which appear to

* The coppice and ravines of Bandunee, and onwards, are favorite haunts of bears : the people report that as many as nine have been shot hereabouts in one day by a party of officers. A doubt seems still to be entertained whether the bear be carnivorous : but unless I am mistaken, Captain Henry Ramsay of Gurwul has seen them feeding on a Jurao. As long ago as the second century B. C., we find the same affirmative fact familiar to the Syrians : " And behold another beast, second, like to a bear, * * * and it had three ribs in the mouth of it, between the teeth of it, and they said thus unto it, Arise, devour much flesh." Daniel vii. 5.

Eight hundred years earlier David tells King Saul : " There came a lion and a bear, and took a lamb out of the flock. 1 Sam. xvii. 34.

converge to a point diametrically opposite to the sun. This rarer phenomenon we have twice seen." These, and the haloes so common in the mountains are the original "glories," of Hindoo and Catholic gods and saints.

Descending to the Suwul river, so named from a village a few miles up, we pass it, at 3927 feet elevation (R. S.) by an iron suspension bridge, called Bisheshwur, from an adjacent temple placed at the confluence of a brook from the Huree Doongra. At this bridge of Sighs, the Hindoo dead of Almorah, are first reduced to ashes and then committed to the stream in the hope of their being finally mingled with the holy water of the Ganges, and the ultimate prospect of adding to the extent and the fertility of Bengal: a nobler futurity than the stopping the bung-hole, &c., which Hamlet contemplates as the fate of Alexander and Cæsar. The Hindoo does not, however, believe that this is all: the spirits of the deceased, going neither to heaven nor to hell, remain lurking about Bisheshwur, where they are occasionally seen by the "belated peasant," celebrating orgies like those revealed to Tam O'Shanter, except that matchless Satan is unknown here; at other times, under the guidance of one Bholanath, on horses, dandees, or foot, they promenade through Almorah with lingering visits to the spots most loved when they were in the flesh—the Buniya's shops. It is not considered either safe or fortunate to meet or even see any of these immaterial pageants, and death is supposed often to follow shortly. Those, however, who survive, affirm, or are believed to affirm, that very many of these ghosts are deficient in one or more members: one has no head, another no feet, and so on, and yet they manage to dance, speak, &c., as well as the rest. This is considered a great wonder: but I explained to my informant that a still greater wonder remained, which was, that after all their members had been dispersed by the elements, any of them should possess head, feet, or any thing else: a difficulty he admitted, but not sufficient to cancel the experience of centuries and of a whole nation.

The following details belong to another excursion.

8th May, 1847.—From Almorah, via Hawulbagh to Somesur, 12 coss, about 18 miles. The road is good, and beyond Hawulbagh keeps along the west or right bank of the Kosilla, passing, beyond the latter place, under spacious cultivated plateaus. The scenery during the

march is always pretty and frequently eminently beautiful, especially the vistas up the lateral vallies. The river winds greatly, sometimes abruptly, flowing in rocky beds, or over broad stony channels ; the banks are fringed with willow, *Quercus incana*, and *annulata*, *Ilex excelsa*, *Nerium odoratum*, *Photinia dubia*, *Rosa Brunonii*, and most luxuriant Pomegranate trees ; the last four are now in full bloom ; the *Photinia* one mass of Hawthorn-like flowers. The upper portions of the mountains are covered with *Cheer* : lower down, the cultivation is pretty general. About three miles short of Somesur, on the left bank of the river, immediately under the furrowed side of Gunnanath, there is a long tract of rich and very level ground, covered with the finest wheat, now nearly ripe ; it is called *Soopeh Kot*, and is continued to and above Somesur, which is placed in the fork of the Kossilla, and Salee or Salmulee rivers, in one of the richest and most lovely vallies of the Himálaya. The elevation is probably 4700 feet above Calcutta, which ensures a warm climate and myriads of flies at this season ; Baalzebub, their king, certainly keeps his court here : the spot however is sacred to Muhadev, as "master of the Moon." His temple stands between two fine deodars, outside which are many shady walnut trees, under which we encamped. The district comprises 50 to 60 villages, the revenue of which is about 4000 rupees : but many Bráhmans are settled, or have possessions hereabouts, whose property is rent-free.

Somesur probably owes its sanctity to the junction here of two other streams with the Kossilla, viz., the Salee from the west, and the Munsaree Roul from the east. The last rises on the N.E. side of Gunnanath, in the pass called Giri-chheena, which separates the affluents of the Kossilla from those of the Surjoo, and affords a route from Bagesur to Somesur, much frequented by the Bhotiyas on their way to Chilkiya. The lower part of this vale is also finely cultivated. The Giri-chheena pass and that of the "Ladder Hill," between Almorah and Bagesur are in the same range.

The rocks between Hawulbagh and Somesur, are chiefly clay slate, in highly inclined strata, transverse to the course of the river, and dipping south : through these the river has excavated deep gorges. On the right bank, there are two or three partial outbursts of granite ; about Somesur, the rock is chiefly quartzose, in vertical strata ; with red and dove-colored clay slate ; higher up the glen there is a quarry of blackish

chlorite slate, near which dykes of decomposing greenstone appear ; about Lodh, the rock is granular quartz.

The priests of Somesur possess a sunud engraved on copper, of which the following is a translation : a copy of the original is appended, interesting in its exhibition of the patois spoken at the court of Almorah three centuries ago : both are by my friend and fellow-traveller, Major T. E. Sampson. .

" Sree Someshwur.

(A dagger here, the mark of the Raja.)

By Muñaraja Dheeraj Sree Raja Baj Buhadoor Chund Devjee : (the 7th from Kulyan Chund.)

In Barmundil (pergunnah, and village,) Royetee, two alees were heretofore (dedicated) to (the above) deity. Having measured two and a quarter ($2\frac{1}{4}$) alees of the unoccupied land, with the banks of the Kosee (adjoining) there are (now) four and a quarter alees (dedicated to him.) To this land appertain the streams, mills, together with the woods and grounds temporarily reclaimed ; all taxes are remitted ; all disputes dismissed ; all griefs discharged ; fines for illegitimate births ; rights of reversion (on extinction of families) ; what may fall from heaven to beneath hell ; dues to horsemen, dog-keepers, hawk-keepers, musicians ; all taxes have I relinquished. Having made (an inscription to this effect on) a copper plate, I have offered it according to my previous vow : (in consideration of the above) provision for the food of the deity, (is to be made as follows.) Four seers of rice, half a seer of dal, one tuka weight of ghee, one pysa weight of salt, incense, sandal, with the eight perfumes, one tuka weight of oil for the lamp for presenting the food in good remembrance of the presence (the Raja.)

Witnesses. Roodur Dev, Luchmeedhur Panre, Beesee Sugutee Gosayun, Bykunt Poorkho Joesee, Nurayun Sahoo, Kasee Adeekaree, Sutroo Sinh Karkee, Negee of Barmundel, Pudarut, Bagyoot Bhundaree, Nukool Sejalee, Kaira Bora. Written by Bhub Dev Joesee, year (of Salivahun) 1570, second day of the dark half moon of Phalgoon ; engraved by Gopal Sonar. Place Rajpoor (Almorah.)

(Sloka.) The gift of himself or another whoever shall resume, seven thousand years may he be a worm living in ordure.

May you be happy and prosperous."

9th May.—To Lodh, about 6 miles, nearly west, up the wide and

beautifully cultivated vale of the Salee river, which rises in and about the level neck of grassy land connecting the Bhut Kot range with the Eiree Deo Hills (Thoee Deo of the map) to the south. The path lies amongst the fields, and is not good. On each side the woody mountains rise in a thousand picturesque forms; in one of the southern glens, near a village called Chinoulee, amongst extensive groves of cedar, is the shrine of the rural deity, Chetr Pal—the Protector of the fields. Towards the end of the stage, the great rounded summit of Doonagiri appears right ahead, to the west, and from Lodh itself, and the hills to the south, there is a good view of the craggy ridge of Bhot Kot, stretching from N. W. to N. N. W. and north; called three coss, about 5 miles, distant; 4040 feet above the village, the elevation of which is 5180 feet above Calcutta.

Lodh is but a small village, a little way down the eastern side of the neck above referred to, which divides the pergunnah of Bora ke rao to the east, from that of Kyra ke row to the west. On the grassy summit of the *col* are some erect stones, resembling those in the Druidical circles; the western declivity of this neck is steep; at its base flows the Dhoulee river, which issues by a tremendous gorge from the great southern glen of Bhot Kot, and pursues its way to the west to join the Gugas, the easternmost affluent of the Ramgunga.

The people of Lodh possess considerable numbers of cows and buffaloes, but do not visit the Bhabur. Amongst the fields, I noticed the cotton plant cultivated to a considerable extent. From its open site, the village enjoys more and cooler air than Someshwur; but the flies were equally countless and tormenting.

10th May.—To the summit of Bhot Kot and back again. The atmosphere was hazy as we ascended, and we had scarce breakfasted on the summit, before the clouds began to collect in the N. W. and thoroughly closed the view, which must be one of the grandest in Kumaon. Thermometer at noon on the summit 72°, in the shade; 2½ hours after, the storm burst heavily, thunder, lightning, rain, wind, and very large and copious hail, under the auspices of which we effected the descent: the rain continuing till 7 p. m.

The ascent lies north from Lodh, along the brink of the precipitous gorge of the Dhoulee; we ultimately descended 300 or 400 feet to this stream, and crossed it, beyond which there is no vestige of a path; but

there are no difficulties beyond the excessive steepness of the acclivity, which, for one pull of 1500 feet is sufficiently great to render the hands almost as useful as the feet. To this succeeds a long, and finally very narrow ridge of rock, and then another, but a shorter steep ascent leads to the summit. The whole mountain is composed of quartz-rock, craggy, but not precipitous on the route, except the defile of the Dhoulee. The ~~summit~~ comprises a level ridge from 200 to 300 yards long, but is not marked by a temple of any kind. To the west it falls rapidly for 2500 feet or so, forming a deep neck, beyond which, bearing W. by N. is the Pundoona Khol, the craggy central bluff, perhaps 8500 feet high, seen from Almorah between Doonagiri and Bhut Kot. Between the Pundoona Khol and Doonagiri, in a densely wooded recess called Lodh Moona, rises the Gugas, which from the summit of Bhut Kot is seen flowing for many miles due south, to join the Ramgunga, here known as the Ruhut and Ruput.

Two or three miles N. E. of Bhut Kot, but separated by a precipitous rocky neck, is the nearly equally elevated ridge of Boora Pinnath, which contains the sources of the Kosilla, and is consecrated by a temple of Muhadev. Between these lofty points, the mountain sends down a precipitous spur to the S. E. on which is the high bluff called *Kourhia*, the ramifications of this run down to Lodh. On another point, which lay to our left as we ascended, is the hamlet of Oodehpoor, with a temple to Goorl Deo, the same who gave name to Goorl-chour, the old cantonment of Chumpawut, and from whom the Limonia laureola is named Goorl-puta. Bhut Kot is well wooded to the summit; the northern side of the whole range is indeed covered with the densest forest. The ascent commences with *Pinus longifolia*, then *Quercus incana*, *lanata*, *dilatata*, and for the last 1500 feet *Quercus semecarpifolia* in abundance. *Rhododendron arboreum* reaches the summit, where we also meet with the *Gaultheria nummularioides*, and in the glens to the north, *Pyrus lanata* and *vestita*, *Cerasus cornuta*, *Kadsura grandiflora*, *Lonicera Govaniana?* and another, *Symplocos crataegifolia*, *Anemone discolor*: but the storm prevented any efficient investigation. The Pundoona Khol possesses the *Paeonia Emodi*; and there, as on Pinnath, Sutboonga, and Motesur, between 7000 and 8000 feet, in shady localities, is to be seen the *Xanthoxylon oxyphyllum* of Mr. Edgeworth, which, generally a weak straggling bush, exhibits itself in

its perfection as a strong scandent shrub, climbing from 30 to 40 feet or more, up the forest trees. Very many of the Cheer Pines on Bhut Kot, and indeed generally in Kumaon, have their fibres spirally twisted to an extraordinary degree : the natives attribute the phenomenon to the action of the winds. The straight and more useful trees are called by them "Sapin," which signifies *straight*, one of the meanings of the Sanscrit *Surul*; a curious coincidence with the French *Sapin*: though less so perhaps, than that of *mirage* and the Sanscrit equivalents *Mrigutrish*, "thirst of the deer," deceived by the appearance of water and *Mureechika* "resembling light." The bark of the Cheer is employed almost exclusively in the smelting of iron-ore in outer Kumaon.

Having afterwards visited Boora Pinnath summit from the eastward, it may be as well to note here its vegetable peculiarities, being in reality the same mountain as Bhut Kot. Though from 400 to 500 feet lower, it abounds with the *Picea Pindrow*, which continues a long way down the glen of the Kosilla, forming, with the following, one of the densest forests I have traversed ; this is the nearest point to the plains at which this fir is met, the direct distance being about 35 miles. Associated with it are the trees enumerated on Bhut Kot, of which the Kilonj (*Quercus dilatata*) here attains a size and beauty rarely seen. Just below the summit, a large tract of rich shaded soil is covered with *Aconitum laeve*, now in full bloom, as is the *Nigala*, or Hill Bamboo, which forms impenetrable thickets. The *Ribes acuminatum* (or *glaciale*?) black currant; *Taxus baccata*, *Strobilanthes Wallichii*, *Limonia laureola*, *Stauntonia angustifolia*, *Pavia indica*, *Wulfenia Amherstiana*, *Orobus luteus*, *Asparagus curillus*, *Uvularia Leschenaultii*, *Carpinus viminea*, *Berberis aristata*, *Eurya acuminata*, *Sabia campanulata*, *Caragana spinosissima*, *Ulmus virgata*, *Rosa macrophylla*, and *Brunonii*, *Daphne cannabina* and *sericea*, several *Lauri* and *Viburna*, *Evonymus tingens*, *Japonica*, and — ; two maples, two hollies, one the common *Ilex dipyrena*, the other a species, (or variety of *dipyrena*,) not unfrequent in Kumaon at about 6000 feet elevation, with a 4-seeded berry. The *Gaultheria* descends to about 7000 feet, at which elevation near the gorge of Kosilla, occurred a tree which appeared to be *Andromeda formosa*; at about 7500—8000 feet occurred a few stunted specimens of *Chamaerops*, exactly in the same state as those on

the Gagur ; the name hereabouts is Jhungra or Jugger : with them, and amongst the Pindrow firs and yew trees, one is surprised to meet the *Dioscorea deltoides*, "Goon," which, in shaded and wet localities, descends to about 6000 feet ; its tubers, of a bright yellow inside, are employed to poison fish.

11th May.—To Dwarahat, about 10 miles west, a cloudy day with smart showers, which, as well as yesterday's storm, a knowing mountaineer told me, were caused by a number of marriages going on in the plains ; but how the two facts were connected, he could not explain. Some confused idea of the figurative tempests said occasionally to brew in the matrimonial atmosphere may have been present to his mind, as well as the storms which are here also popularly believed to accompany the conjunction of sun and moon, or the "Lugh," or entrance of the sun into a sign. The people of Kumaon compute falls of rain by various measures of weight and capacity ; from a mana (half ser,) up to a nailee and puseree, the last being that which soaks the ground thoroughly, and such as we experienced to-day. Beyond this they keep no reckoning : it is "be-thikana."

They also measure time by weight (the chitak) : no doubt from the use of the ghuree (clepsydra.)

The path follows the left or south bank of the Dhoulee to its junction with the Gugas, and is stony, and bad from the frequent water-cuts for irrigation. The *Cinnamomum albiflorum*, now in flower, is abundant, and conspicuous by its young leaves of a delicate pink color. At the meeting of the waters, the vale is beautifully cultivated, by the inhabitants of two pretty large villages, Bint on the right, Bhutor on the left bank. The climate is sufficiently warm for the *Bauhinia variegata*, *Dalbergia Ougeinensis*, and several large *Bombax malabaricum*. Hence in a W. S. W. direction, there is a rather steep ascent of a thousand feet to the Ookhul Lekh pass, over the southern shoulder of Doonagiri ; then a descent for about four miles down a narrow and pretty glen, and finally over extensive cultivated levels on which are scattered the villages of Dwara, "the Sublime Porte," of the *Kutyoors* : this is the name of the Pergunnah, Hath being that of the chief village : 5082 feet above Calcutta. In days of yore it was the residence of the Kuhtora or Kutyoor chiefs of Kumaon, to whom popular tradition assigns the possession of the mountains from Joomla to the Ganges,

and the construction of 360 temples and 72 wells ; of the latter one only remains, covered in by a dome exceedingly well built of cut stone. The temples are of the same material, and are scattered in groups and lines over the fields. They are of the usual pyramidal form, surmounted by the Turkscap ornament, with porticoes indifferently to the east or west. The greatest height is about 30 feet. They are of a plain style, but near the tank Shalde Pokhur, by a clump of date trees, and an old Sillung, are the ruins of a small, but elaborately carved temple, covered with sculpture representing gods, men, elephants, &c. ; it is much dilapidated, and its graven images and stories lie scattered around. None of these edifices are any longer held in any respect ; on the contrary, having been desecrated by the Rohillas, they are made available as hay and corn stores, being succeeded by a much more modern, and well-built temple, where Budreenath and his priests are well cared for. The Kuthoora would appear to have been a more liberal and powerful dynasty than any that succeeded them ; the name may possibly be allied to that of the Kuttaur tribe of Siyahposhes, amongst whom also we find at Chitral the chief styled Shah Kutore ; but they are generally considered Soorujyunsee Rajputs. No remnant of an inscription remains at Dwara, but a portion of one has been carried up to the shrine of Devee on Doonagiri, bearing date Saka 1105, A. D. 1029, which may be assumed as that of the temples.

On the Ookhul Lekh, the rock is quartz, which at Dwara is succeeded by gneiss, the strata rising N. E. towards Doonagiri ; to the S. E. blocks like granite boulders are seen on the continuation of the Ookhul Lekh range. Doonagiri is composed of blue clay slate, with some quartz, apparently rising towards Bhut Kot, in the same direction as the gneiss ; towards the eastern base of the mountain, there is a great deal of red Ochry soil, probably arising from the disintegration of the slates and quartz. Doonagiri as seen from Dwara, is a fine saddle-back mountain, its easy slopes covered with woods and clumps of Banj oak, interspersed with spacious glades of meadow. The summit may be about 2 miles distant from the bungalow, and is continued far to the N. W. in a range of nearly equal elevation. In a pretty cultivated dell along its S. W. side flows the Kotlar Nudee, of which the source is at Dwara from Doonagiri ; the road to Lohba and Budreenath follows its course towards the Ramgunga, beyond which the lofty range called

Doodootolee attains above 10,000 feet elevation ; another road leads via Palee to Sireenugger ; there is also a route, though a bad one, to Kakur Ghat, near Munurs, on the Kosilla.

13th May.—An easy walk of two hours brought us to the summit of Doonagiri, elevated above Calcutta 7454 feet. The woods on the west side are chiefly of *Quercus incana* ; on the summit, *Quercus lanata*, *Iphisia govaiana*, and *Caragana spinosissima*, (the last now in flower,) are found ; the eastern side is wholly covered by *Pinus longifolia*, a tree which seldom allows a rival near its throne.

Doonagiri is said to be the "Dronachul" of the Poorans. "The mountain of Drona," the Military Preceptor of the Pandoos, who have left many traditions about here. The Pundoona Khol to the N. N. E. of this, derives its name from them, where the Gugas rises in the sacred forest called Lodh Moona, where Gugas Rekhi performed penance, erected lings, and by magic power, caused the springs of the stream, which since bears his name, to gush from the quartz formation. The people consider him identical with Gurg, the saint of the Gagur. Doonagiri was originally part and parcel of Ceylon, and was brought here, half way on the back of Hunooman, who getting weary or sleepy, the rest of the *trajet* was performed on a flash of lightning,—or Indra's rocket, as the people poetically call it. They affirm that the Philosopher's stone exists here, and several peasants cutting grass, have had their *Koorpees* turned into gold by accidentally striking it ; a fiction probably connected with the Jwalamat grass (*Anthistiria anathera*), which grows here, and has luminous roots.

The summit of the ridge is rounded, and affords easy and pleasant walks, especially to the north. The loftiest point is occupied by a celebrated shrine of Devee, which however consists merely of a small and simple roofless enclosure, containing two small slabs of stone, believed to have placed themselves here spontaneously,—with a small sculpture representing Muhadev and Devee ; evidently from Dwara. From the same quarry are two broken pieces of carved stone, containing a portion of an inscription bearing date 1105 Saka : but so far are the people from believing these were brought up from Dwara, that they are persuaded the fragments were rained from heaven (akash se burkha.) The officiating priest, however, set small store on the heavenly gift, for he sold it for four annas to my fellow-traveller, who was

desirous of decyphering the inscription at his leisure, and actually carried it to Lodh ; there however, the whole countryside assembled to reclaim their goddess, which was freely restored with mutual explanations, my friend shewing them it was merely a bit of some old edifice, and they assuring us that it had fallen from the skies. Their extreme docility in these matters is indicated by such a government under a Queen Log ; in Kunnawur, the inhabitants require being kept in order by the most frightful images of alligator and tiger-headed monsters, and Chimærus with a hundred arms, disemboweling and devouring their foes. It is wonderful that the temporal rulers of the world should never have taken a hint from the sanctuary, and converted their menageries into active means for quelling the spirit of revolt ; it is probable that a hundred lions judiciously loosed in Paris during the Three glorious days might have saved their master his throne ; but hitherto, this engine of state has only been brought passively into operation, and by only two nations, the Chaldeans and the Romans, who were wont to feed their lions on the martyrs ; but martyrs are rare now-a-days.

At the celebration of the Dusuhra, the inhabitants of the surrounding districts assemble at Doonagiri in considerable numbers for devotion and traffic ; the existence of the fair, however, denotes a somewhat inferior rank in our "Dark Lady of Doona ;" at Doonagiri, &c., her festival is supposed to be perpetual ; and gifts are equally acceptable during all the twelve months. Returned to Lodh in the afternoon, and on the 14th to Somesur, where the heat is now becoming oppressive.

15th May.—To Pinnath village, the "Muth" of the map ; at about 7 miles : the first half up the right bank of the Kosilla, the remainder till, close to Pinnath, on the left. About three miles from this place, the made road turns up the mountain to the east, to Byznath, which is called 6 coss distant. The scenery is very lovely ; hills of every size and form covered with oak and pine contrasting with the rich, though narrow belt of ripening corn along the course of the river, which, now reduced to a mere burn, flows along a ravine fringed with Rose, Whitethorn, Willow, Phulliant and Banj oak, Symplocos racemosa, Berberis aristata, Berchemia floribunda, Indigofera (*arborea*?) Photinia dubia ; forming a delicious jumble of colors and scents. About 2 miles above Somesur, on the opposite bank, is the romantic hamlet of Jyoshee ka mulla, on a hill, with a Vallombrosian foliage of Walnut,

Deodar, Kharuk, Pomegranate, &c. Approaching Pinnath, we crossed a jutting spur on the left bank of the river by the Rooena Chheena ; above this the valley again expands and is well cultivated for four or five miles to the N. W., where the Kosilla flows east from its source, but is turned S. E. by a range on its left bank, over which, near the angle, is the Hur Chheena pass, leading to Byznath. Pinnath village is half a mile beyond the' Rooena Chheena, and is perhaps 5200 feet above the sea, and 3500 below the craggy summits from which it has its name. A colony of Gosains resides here in several very substantial houses, surrounded by trees. Six or seven of their successive Muhunts or Abbotts, are buried close by, each with a small dome over his remains, and a miniature ling as his only epitaph ; perhaps as the symbol of his devotion to Siva, who, as Pinakeshwur, "Lord of the Bow," or Trident, gives name to the spot. The Bow is probably the moon's crescent, Siva being Somesur, or Lord of the moon. The monks here possess two brass plates, with Sunuds engraved, of which the following are translations by Major Sampson, whose transcripts of the originals are also annexed. The dates coincide with the foundation of Almorah, the rulers of which probably thought it expedient to endow or sanctify the source of the river which passed by their new capital.

(No. 2.)

Sree Peenakees.

(Raja's mark—a dagger.)

By Muharaja Dhiraj Sree Raja Oodeot Chund Dev.

An offering of land.

In Row Pergunna three ales in Dhamkurow ; in Idiakot one alee in Dheolrow ; these places offered (making together) four (alees.) In the Pergunna of the plains, Roodurpoor, I have offered (the village of) Pepuliyukan Oortawala ; together with their streams, mills, woods, ground temporarily cleared, forests (and) mountains, have I offered for lighting a lamp without intermission. All taxes are remitted, disputes dismissed ; fines for illegitimate births, rights of reversion, what may fall from heaven, to below hell, dues to horsemen, dog-keepers, hawk-keepers, musicians, grooms ; all taxes have I relinquished and offered.

Witnesses Muharaj Koomar Sree Gyaan Chund, Sree Hureehur Chund Gosayen, Beereshwur Pande Poorohit, Beereshwur Lukshmee-putee Pande Gooroo ; Sree Nurayun Joo ; Pruta Padeel, Juswunt Sing ;

Arjoon Sing ; Jeetru Bhan ; Soojan Sing Goosahee ; Ruma Pundit ; Sreenath Adhikaree ; Reekhee kes Josee ; Urjoon Sahoo ; Kheem-kurnu Sejwalee ; the twenty-two thousand (inhabitants) of Barmundil ; written by Bhub Dev Josee, year (of Salivahun) 1613, the fourth day of the light half of Phalgoon. Friday : Engraved by Gopal Sonar.

(No. 3.)

Sree Peenakeshwur. Sree Bhawanee.

(Mark of the Raja, a dagger.)

By Muharaj Dhiraj Sree Raja Baj Buhadoor Chund Dev. By Sree Ranee Bisekmutee Jee.

In fulfilment of a vow, an offering of land to the gods (above named.)

In Mulleepucheesee (Pergunna) in Idiakot (village) six alees, eighteen beesees in Rolena (name of a portion of the village lands) have we offered ; (also) two alees six beesees in Loesul (village) instead of.(the like already dedicated) in Akolia*(village) in Tulleepucheesee (Pergunna) have we offered for offering to Purmeshwur every day food, viz., five muna ($2\frac{1}{2}$ sers) rice for the food, one muna of mas dal, one handful of unbroken rice (for the teeka on the god's forehead;) half a pul (2 pice weight) of ghee for the lamp, half a pul of ghee for the incense along with the food ; thus much for Muhamad's *food. Four munas of flour, two puls of ghee, are to be offered to Devee Jee daily. To these lands are to appertain the streams, mills, woods, grounds temporarily cleared, (and) wastes ; all taxes are remitted,—we have relinquished all ; be they free from all disputes, fines for illegitimate births, rights of reversion, what may fall from heaven, to below hell, dues to horsemen, dog-keepers, musicians, watchmen ; all these taxes have become Purmeshwur's. Let there be no hindrance. Witnesses Muharaj Koomar Sree Oodoo Chund Gosayee, Bisee Jugtee Rai Gosayee, Idhyakoont Poorkho Josee, Nurayun Bhan Sahoo, Kasee Adheekaree Soor Sinh Karkee, Koomeroo Teragee, Suntokh Choudree, Dulpatee Karkee, Saliwan Boro, Gourja Chakur, Pudarut Bhagyoot Bhundaree, Nukool Sejwalee. Written by Chinta Sahoo, year (of Salivahun) 1576, the 30th of the dark half of Asar, Sunday. Place Rajpoor (Almorah.)

Soobha Negee, Anunt Dev Josee. Engraved by Gopal Sonar.

The most remarkable circumstance in the last grant is that one of the donors should be of the sex, which however subject in all ages and countries, to the influence of the Josees, seldom in Indian documents, appears on the scene.

16th May.—To Pinnath temple and summit; home by the source of the Kosilla; which occupied $10\frac{1}{2}$ hours' actual walking. The route to the temple, which is about half way up, follows a great spur, and except at one place where steps have been cut to facilitate the approach, is easy, with a deep glen on the left, through which flows the Deogar stream to join the Kosilla at the village. The temples are scarce worth visiting, but the site is pleasant; a grassy expansion of the ridge, shaded by some superb Kilonj oaks; the first is a small conical structure, 8 or 10 feet high, dedicated to Bhyroo; the main temple is close to this on the north, a square, slated edifice, with the door facing the south, and figures of rajas, &c., sculptured on the walls. The roof of the portico is formed by the Indian arch, and on its sides are represented the five Pandocs; the adytum is small, and contains nothing but one or two images of Muhadev and Devee; about 44 years since the original pile was nearly all overthrown by an earthquake, which sent most of the materials and apparatus bounding down the steep glens to the Kosilla. The place is only frequented in the rainy season and autumn, when in October, there is a mela. The want of water is poorly supplied by a cistern and several wells, 12 or 15 feet deep, excavated in the rock, the contents of which are by no means inviting. The elevation as given in the map, is 7,111 feet, which seems correct; but elsewhere (*Asiatic Researches, &c.*) Captain Webb quotes it at 7628 and 7700. So far, the rock is quartz, and slate, but onwards quartz only, disposed in vast beds, the outcrop of which faces W. S. W. forming crags which near the summit are rather difficult to climb over. The area of this is not above fifteen feet across, with precipitous glens all around, and an exceedingly narrow rocky ridge connecting it with Bhut Kot, which seems about 500 feet higher, bearing S. W. The Boora Pinnath range is continued N. W., in a very lofty and comparatively level spur, called Birchoola, not under 8000 feet, excessively precipitous to the left, or W. S. W., but on the right sloping gently, and clothed with dense forest of Pindrow fir and other alpine trees of magnificent dimensions and verdure; in this is the main source of the Kosilla, which hence flows nearly due east for about 5 miles, its northern bank being formed by the slopes of Gopalkot mountain, on whose craggy summit the Kutyoora rajas had a stronghold in which their treasures were deposited. The waters between Bhut Kot and

Birchoola form a considerable stream which joins the Ramgunga, a few miles short of which it passes through a crater-like cavity, now nearly dry, but full in the rains, called the Turag ke Tal, or Lake of the Pool. It is seen from Boora Pinnath, and is 4028 feet above Calcutta. Mr. Batten found that this pool owing its existence to a high natural dyke of limestone conglomerate, through which the stream flows by a series of caverns, from one of which it issues in a fine cascade.

Beyond Gopalkot, the Birchoola range is crossed by the Burm Deo Chheena, which is the pass between Byznath and the Ramgunga; I only followed it for about three miles to a spot where the "Duree Panee," a good spring, rises close to the summit level and sends a stream towards the Turag ke Tal; from this point we dipped by a pathless and extremely steep fall of a thousand feet to the apparent source of the Kosilla, now perfectly waterless, nor, for two or three miles down does its bed contain any thing but occasional pools. Hereabouts we came on several traces of bears and tigers, and on the half eaten carcase of a deer. The woods are so dense, as quite to exclude the sunbeams, with thickets of hill bamboo, &c. almost impenetrable. In a few miles, the course of the river becomes no longer practicable; the stream entering an extremely narrow and deep gorge, in which it flows for two or three miles, till it emerges on the valley of Pinnath; on each side of the entrance, the quartzose strata rise vertically and form two grand and most jagged portals, the bases of which as well as the gorge itself, are exquisitely wooded. The Kosilla here pierces the bearing of the range from Doonagiri N. E. These rocks are known by the name Sutulia or Chetulia, which is that of the mountain here forming the left bank, to the summit of which, at least a thousand feet above the river, we gradually ascended, by a very narrow path, with vertical steeps beneath; this is called the Shookona pass. The summit commands a beautiful view of Pinnath valley to the S. E. on the left hand, and in front stretches the spacious and level valley of Kuthoor or Kutyoor, with Byznath in the centre, at the junction of the Gurool with the Gaomutee river. The elevation is 3545 feet above Calcutta; the climate is said to be hot, and the air unhealthy: yet the cultivation seems extensive, and is said in former days to have reached far up the neighbouring hills, now covered with Pine. The place is still distinguished by the finest temples in Kumaon, though much ruined by

the Rohillas ; near these the fish are religiously preserved, no doubt in honor of the Matsya avatar ; it is curious enough to discover the same superstition amongst the ancient Syrians, as noted by Xenophon in the *Anabasis*.

With frequent falls to a. hands from the quantity of *pirol* or pine-leaves on the ground, we descended to the Kosilla and crossed it where it quits the Sutulia gorge between two huge crags. A mile or more lower down, on the right bank is Kantulee village, 5395 feet above Calcutta (R. S.) where the Sugar-cane is largely cultivated. Pinnath (Muth) Hamlet is two miles farther down.

18th May.—From Somesur to Gunnanath, 6 or 7 miles, the first two along the left bank of the Kosilla, crossing the Munsaree Roul, and then up the pretty dell of Khylkhoor watered by a stream from Gunnanath. Near its confluence with the Kosilla stands a grove of cedars, sacred to Kshetr Pal ; a little higher up, on the same (left) bank, dwells an "Olia," or Hail-man, "Indra-ka-bhugut," whose duty, for which he is well fed, consists in the repetition of "munturs," or, in extreme cases, pouring out libations of his own blood to Jupiter Tonans, in order to protect the crops from the hail. Lightning conductors would, perchance, be more effectual than both Tonans and Wizard ; for, in spite of all his incantations and cuttings, and this sacerdotal guano with which he sprinkles the fields, the hailstorms are very destructive in Kumaon : during this very month, the entire rubhee crop of the Kupkot valley was levelled with the ground, and abandoned to the cattle ; on the 20th of October following, a hailstorm from the N. W. fell on the province, including Almogah, killing birds, the lesser cattle, and breaking down the little vegetation there remaining. It came on about 3 p. m. like one of Milton's "two black clouds with heaven's artillery fraught," in the form of a stupendous arch, which rapidly overspread the sky, and, depositing a thick stratum of hail on the ground, passed over in about half an hour. This storm extended its devastation as far south as Banda in Bundelkund, and probably much further. The foul weather, which we experienced on Bhut Kot, was also very general over India, which probably shares in all the greater atmospheric changes of the Himalaya.

Daily observation in these mountains, commends the sagacity of the European Philosopher, who, in his distant study, detected and unravel-

led the tangled processes of thought and practice, which maintain the Olia and similar swindlers. "Ayant éprouvé que certaines pratiques envers ses semblables avaient l'effet de modifier à son gré leurs affections, et de diriger leur conduite, il employa ces pratiques avec les êtres puissants de l'univers ; il se dit ; "quand now semblable, plus fort que moi, veut me faire du mal, je m'abaisse devant lui, et ma prière à l'arrête de le calmer. Je prierai les êtres puissante qui me frappent ; je supplierai les intelligences des vents, des astres, des eaux, et elles m'entendront ; je les conjurerai de detourner les maux, de me donner les biens dont elles disposent ; je les toucherai par mes larmes ; je les flécherai par mes dons, et je jouirai du bien-être.

Et l'homme, simple dans l'enfance de sa raison, parla au soleil, à la lune ; il anima de son esprit et de ses passions les grands agents de la nature ; il crut, par de vains sons, par de vaines pratiques, changer leurs lois inflexibles : erreur funeste ! Il pria la pierre de monter, l'eau de s'elever, les montagnes de se transporter, et substituant un monde fantastique au monde véritable, il se constitua des êtres d'opinion, pour l'epouvantail de son esprit, et le tourment de sa race." Les Ruines, C. xxii.

If there be but one step from the sublime to the ridiculous, a step in the opposite direction leads to superstition ; which seems to enslave the mind of the mountaineer in the same degree as "the mountain Nymph, sweet liberty," emancipates his person ; the grand scale as to quantity, number, force, and variety, on which all the processes of nature are carried on around, seems universally to have quelled his spirit to the most abject submission to the marvellous and supernatural.

From the enchanter's home, our path gradually ascended the sloping southern face of Gunnanath, amongst Pine, and a profusion of *Combre-tum nanum* ; on the right hand, across the Khylkoor, is the woody range of Bhalkot, on which Hustee Dul, the Gorkhalee Governor of the province was killed in 1815. It is connected with Gunnanath to the N. E. by a low and spacious plot of grassy land, called *Gunes ka Tul*, from which the Khylkoor flows to the west, and the Takoola, also draining the south face of Gunnanath, to the east and south, where it waters the Sutrali valley.

Gunnanath mountain extends from east to west about $2\frac{1}{2}$ or 3 miles, and is composed of a kind of iron clay slate (or greenstone?) with a

ferruginous quartzose breccia ; towards the Somesur foot of the mountain, Lieutenant R. Strachey came on large masses of black basalt. The southern face is rather bare, but grassy, with a continuous declivity, seamed by many rounded, and comparatively shallow furrows. The northern face, on the contrary is very steep, covered with Rhododendron, pine, banj oak, &c. Some of the latter also flourish in groups towards the eastern summit, offering admirable specimens of this tree in its perfection, with a magnificent spreading crown, almost reaching the earth all round. The temple of Malka Devee, small and in ruins occupies this end ; on the western extremity, 6930 feet above Calcutta, Hustee Dul erected a stockade of which traces remain ; but the position was bad, without water and of easy access from the east, the whole summit affording a nearly level and very pleasant walk, over swelling lawns, possessing much of the character, though not quite the breadth of an English Park ; with a view of Emodus such as no Park in the world can pretend to.

The shrine of Gunnanath nestles in a snug nook on the southern exposure of the mountain, in one of the furrows before mentioned, nearly 600 feet below the summit. Here the rock forms an overhanging crag of perhaps fifteen feet, from which a streamlet trickles down, and is received in a reservoir shaded by laurel and Sillung trees. Under the rock repose the images of Gunes, Devee, the Ling, &c., duly besflowered and begheed by a rather strong establishment of brahmuns and gosaeens, who inhabit a substantial dhurmsala, included in the gully, and commanding a pleasant view of the fertile vallies beneath, on which like so many eagles, they pounce at their prey.

May 19th.—To Hawulbagh, called 8^o coss, about 13 miles. Descended to the Sutrali valley opposite Unkholee or Umkesur, the usual stage between Almorah and Bagesur ; and thence followed the Takoola to Bukona (not half the distance,) where we breakfasted by a mound sacred to Goorl Deo, and shaded by large Khuruk and Kukur trees. The rock here is mica-slate, but higher up, towards Umkolee, all gneiss. Below Bukola, the road becomes very rocky and seems not to have been repaired for many years : though hilly and uneven, there are none of the heavy ascents which exist on the direct route to Almorah. Opposite Koron village the mountains assume a most picturesque and diversified outline ; here the road quits the line of the Takoola, and

ascends some hundred feet to the Moonee-moonee pass, on the crest of which there is a fine old newla or covered well, affording cool water, which none of the streams do at this season. From this we descended to the Patia valley, with many hamlets and good cultivation, lying along one of the Binsur streams ; and reached the Kosilla about three miles above Hawulbagh, opposite the neglected temple of Bumsir. One mile on, the road crosses the "Beemoota," a long and narrow rent 50 feet deep, in a stratum of mica-slate, and dipping with it N. E. : tradition attributes the chasm to an act of Bheem Singh, which only a Hindoo traveller would commit to paper. About a mile east of Almorah town, 500 feet lower, on the open Gwallakooree ke Dhar, about 400 yards east of the Dhamoo ka Dhoora garden, and south of Buldotee Quarry, Mr. John Strachey, C. S. discovered a smaller pit, also in the mica-slate, about five feet deep, from which issues a considerable column of steam, marking the presence of a hot spring beneath. In the cold season, early in the morning this is condensed into vapor, which long since attracted the attention of the townspeople, who ascribe the origin of the phenomenon to this spot being a Sidh ka Sumadhi, or tomb of an ascetic whose body burns with the fervour of divine love. The Khusya population, however, assert that all such hot water is made by Devee. No religious respect is now shone to the spot, on the 14th of November last, at 6½ A. M. the temperature of the air being 40° ; that of the steam at 5 feet deep was 68 : beyond this it was impossible to introduce a thermometer the crevice being too small to admit one's body, and at this depth altering its direction laterally. The growth of grass, ferns &c., in the mouth of the pit proves that no deleterious gas accompanies the vapor : this test however, will not hold for Carbonic acid gas.

